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SYLLABUS

OF THE

OBSTETRICAL LECTURES

IN THE

MEDICAL DEPARTMENT OF THE UNIVERSITY
OF PENNSYLVANIA.

BY

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THIRD EDITION.

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DEDICATED
TO
THE MEDICAL CLASS OF THE UNIVERSITY
OF PENNSYLVANIA.

PREFACE TO THIRD EDITION.

THE Author offers to the medical class a third edition of the SYLLABUS in order to include the additions which have appeared in the lectures during the past two years. He desires also to gratefully acknowledge the reception the book continues to receive from his own and other students.

1028 SPRUCE ST., October, 1893.

PREFACE TO SECOND EDITION.

THE experiment of placing a book of this character in the hands of the medical class having demonstrated its usefulness, and the exhaustion of the first edition, have induced the Author to prepare a second edition, in which the same plan of brevity and conciseness has been followed. Much of the text has been re-written, and new material added, notably in the chapters on Infant Feeding, Pathology of the Puerperium, Obstetric Operations, and Dystocia. At the request of many of the Author's pupils an Index has been added.

1028 SPRUCE STREET, PHILADELPHIA,
July, 1891.

PREFACE TO FIRST EDITION.

WITH the approval of Professor HIRST this Syllabus has been prepared to meet the difficulty of accurate note-taking, which most medical students encounter. The subject-matter has been so arranged that uninterrupted attendance upon lectures is essential to a full knowledge of the course. The design of the book, therefore, is to secure for the student a logical and consecutive *outline* of his work, and to aid him in classifying the knowledge he acquires in the lecture-room. The Author desires to express his indebtedness to Professor HIRST for many suggestions, and for his kindly interest in the preparation of the work, and to indulge the hope that the medical class may find the book of some service to them.

PHILADELPHIA, December, 1889.

CONTENTS.

PART I.

	PAGE
MENSTRUATION	17
OVULATION	18
INSEMINATION	20
FERTILIZATION	20
THE AMNION	26
THE CHORION	28
THE UMBILICAL CORD	30
THE DECIDUÆ	31
THE PLACENTA	33
PHYSIOLOGY OF THE MATURE FŒTUS	36
Circulation	36
Excretions	36
Multiple Impregnation	36
Super-impregnation	37
DISEASES OF THE FŒTUS IN UTERO	38
Deformities and Monstrosities	38
Infectious Diseases	40
Diseases of Skin, Brain, Serous Membranes, Heart, Connective Tissue, Tumors, Rachitis, Anasarca, Fractures, Anchyloses, Luxations, Amputations, External Violence	39, 40
Maternal Conditions affecting Fœtus	41
Fœtal Death, signs of, changes in Fœtus after	42
Syphilis	42
Habitual Death of Fœtus	44
PHYSIOLOGY OF THE NEWBORN INFANT	45
Respiration	45
Weight	45

	PAGE
Digestion	45
Excretions	45
Temperature	45
Eyesight	45
Pulse	45
Blood	46
Liver	47
Heart	47
Cord	47
Medico-Legal Points	47
Anatomical Points	47
PREMATURE INFANTS	48
Incubation and Gavage	48
Sclerema	48
MANAGEMENT OF NEWBORN INFANT	48
Clothing	48
Feeding	49
Cleansing	56
Airing	56
Resting-Place	56
INJURIES TO INFANT DURING LABOR	56
Brain	56
Peripheral Nerves	57
Skull	57
Scalp	57
Face	58
Neck	58
Limbs	58
Trunk	58
Bowel	59
ASPHYXIA NEONATORUM	59
DISEASES OF THE NEWBORN INFANT	61
Diseases of the Lungs	61
Syphilis	63
Mastitis	64
Specific Fevers	64
Congenital Deformities	64

	PAGE
Nasal Catarrh	65
Diseases of the Mouth	65
Colic	66
Diarrhœa	66
Constipation	66
Diseases of the Skin	66
Ophthalmia Neonatorum	67
Hemophilia	67
Icterus	68
Cyanosis	68
Congenital Heart Affections	68
Diseases of the Umbilicus	69
Tetanus	70
Melæna	70
Intestinal Perforation and Intussusception	70
Buhl's Disease	70
Winckel's Disease	71
Œdema Neonatorum	71
Bloody Discharge from Genitalia of Female Children	71
Sudden Death of the Infant	71
Medication	71
PATHOLOGY OF THE PUERPERAL STATE	72
Abnormalities of Involution	72
Acute Tympanitis	73
Puerperal Anæmia	74
Repair of Injuries after Labor	74
Puerperal Hemorrhages	75
Anomalies of the Breasts	77
Diseases of the Urinary Apparatus	81
Diseases of the Nervous System	82
Puerperal Fever	83

PART II.

ANATOMY OF THE PELVIS OBSTETRICALLY CONSIDERED	97
DEFORMITIES OF THE PELVIS	100
PELVIMETRY	102

	PAGE
FŒTOMETRY	105
ANOMALIES OF THE SOFT PARTS	105
ANTISEPSIS	106
DIAGNOSIS OF PREGNANCY	110
PHYSIOLOGY OF PREGNANCY	113
PATHOLOGY OF PREGNANCY	118
Diseases of the Genitalia	118
Diseases of the Alimentary Canal	123
Diseases of the Urinary Apparatus	126
Diseases of the Nervous System	130
Diseases of the Circulatory Apparatus	132
Diseases of the Respiratory Apparatus	134
Diseases of the Osseous System	135
Infectious Diseases	135
Diseases of the Skin	136
Injuries and Accidents	137
Surgical Operations	137
Abortion, Miscarriage, Premature Labor	138
Extrauterine Pregnancy	141
LABOR	150
Physiology	150
Management	152
PUERPERIUM	154
Physiology	154
Management	158
MECHANISM OF LABOR	161
OBSTETRICAL OPERATIONS	176
Induction of Premature Labor and Abortion	176
Forceps	179
Extraction of Breech	182
Version	183
Embryotomy	187
Symphyseotomy	189
Cæsarean Section	189
Laparo-elytrotomy	192
Cœlio-cystetcomy	192
Abdominal Section for Obstetrical Complications	193

	PAGE
DYSTOCIA	193
Anomalies in Expulsive Force	193
Excessive Uterine Action	193
Uterine Inertia	194
Anomalies in Force of Resistance	195
Maternal Obstructions	195
Labor in Deformed Pelvis	195
Congenital Anomalies of Development in the Genital Canal	196
Closure and Contraction of the Cervix	196
Closure and Contraction of the Vagina or Vulvæ	197
Uterine Displacements	197
Tumors of the Genital Canal	197
Tumors of Neighboring Organs	197
Fœtal Obstructions	198
Overgrowth	198
Malformations and Tumors	198
Diseases	198
Mal-presentations and Positions	199
Multiple Birth	199
Abnormalities in the Fœtal Appendages	200
Dystocia due to Accident to Child or Mother	200
Prolapse of Cord	200
Rupture of Cord	200
Placenta Prævia	201
Accidental Hemorrhage	202
Post-partum Hemorrhage	204
Hemorrhage from Injuries of Lower Parturient Canal	205
Rupture of Uterus	206
Inversion of Uterus	207
Rupture of Pelvic Joints and Bones	208
Diastasis of Recti Muscles	208
Dystocia due to Disease	208
Puerperal Convulsions	208
Shock	210

	PAGE
Typhoid, Pneumonia and other Adynamic Diseases	211
Valvular Heart Disease	211
SUDDEN DEATH	211
POST-MORTEM DELIVERY	212

SYLLABUS OF OBSTETRIC LECTURES.

LECTURES TO GRADUATING CLASS.

PART I.

Menstruation.

Definition.—A periodic discharge of a sanguineous fluid from the uterus and Fallopian tubes, occurring during the time of a woman's sexual activity, from puberty to the menopause.

Time of Occurrence.—In temperate climates, in Teutonic and Anglo-Saxon girls, the first menstruation occurs oftenest in the fifteenth year. It is influenced by (a) Race, (b) Mode of Life, (c) Climate, (d) Heredity, (e) Genital Sense. Once established it should return every four weeks.

Time of Cessation.—Usually in the 45th year.

Phenomena.

1. *Congestion.*—Manifested in changes in uterine body, mucous membrane, adnexa, and peritoneum.

2. *Molimina.*—The clinical and subjective manifestations, as nervous irritability, pigmentation, enlargement of thyroid, changes in voice and circulation, etc.

3. *Rise of Temperature.*— 0.5° C.

4. *Character of Flow.*—Alkaline and composed of blood, shreds of mucous membrane, vaginal and uterine secretion. Is darker than ordinary blood and should not clot.

5. *Duration of Flow.*—The average is three days.

6. *Quantity.*—Four to six ounces.

Theories in explanation of its occurrence.

1. *Why it occurs :—*

(a) Cleansing. Plethora. The ancients' idea.

(b) Pflüger's. The ripening of the ovule within the ovary and the development of the Graafian follicle, producing a nervous irritation culminating at the end of the menstrual month, which leads to congestion and other menstrual phenomena.

(c) Result of the death and degeneration of the ovule. If the ovule happens to be impregnated, menstruation is prevented. If conception has not occurred, the congested condition of the mucous membrane, prepared to receive and surround the ovule, results in the menstrual discharge.

(d) Comparative anatomy and physiology. Explained by similarity to heat or rut.

(e) The most satisfactory theory is that it occurs in obedience to a central nervous influence reflected through the sympathetic nervous system to the ovaries and uterus.

2. *How it occurs :—*

(a) Kundrat, Engelmann, Williams: By fatty degeneration of the mucous membrane.

(b) Leopold: By diapedesis. This is the most recent explanation.

Connection between Ovulation and Menstruation.—From Leopold's investigations upon 29 pairs of ovaries, examined at varying intervals after the menstrual period, it appears that menstruation and ovulation may occur independently—*i. e.*, neither is dependent upon the other, but both have a common cause. Women may conceive without ever having menstruated, and may menstruate, after oöphorectomy for instance, without ovulating.

Ovulation.

The Ovary.—Weight, 5.5 grms. or 78 grains. Diameters, 38 x 19 x 13 mm. or $1\frac{1}{2}$ x $\frac{3}{4}$ x $\frac{1}{2}$ inches. Constituent parts :—stroma, glandular substance, epithelial covering, bloodvessels, lymphatics and nerves. The epithelial covering of the ovary differs from the epithelium lining the rest of the peritoneal surface, in

that it is columnar and has a special function in the formation of the ovum.

Development of Graafian Follicle.—The specialized columnar epithelium covering the ovary dips down into the ovarian substance, forming “egg-cords,” and carries highly specialized cells. A constriction occurs above and below one of these specialized cells and the follicle thus formed is an immature Graafian follicle, containing an immature ovum. These follicles at first lie under the capsule of the ovary, but later are deeper in the ovarian structure.

Anatomy of Fully Developed Graafian Follicle.—*From without inward.*—1. Theca folliculi, composed of tunica fibrosa and tunica propria. 2. Membrana granulosa. 3. Discus proligerus, surrounding the ovule. 4. Liquor folliculi.

Anatomy of Ovum.—*From without inward.*—1. Vitelline membrane. 2. Zona pellucida. 3. Internal cell membrane: these three comprising the cell wall. 4. Yolk, or cell contents. 5. Germinal vesicle, or nucleus. 6. Germinal spot, or nucleolus.

Maturation of the Ovum and Preparation for its Impregnation.

1st stage. Karyokinesis. Amphi-aster stage.

2d stage. Extrusion of two polar globules.

3d stage. The female pronucleus.

It is thought these changes occur to prevent parthenogenesis.

Discharge of Mature Ovum (Ovulation).—Theories to account for its occurrence.

1. Sexual congress.

2. Periodicity.

3. Congestion—increasing the amount of liquor folliculi.

4. Influence of sympathetic nervous system.

Mechanism of Escape of the Ovule.—Tunica propria fails at the part nearest surface of ovary (called *stigma*) ; tunica fibrosa also gives way after a time, from pressure of the liquor folliculi, which increases in amount as a result of the liquefaction or watery secretion of the cells of the membrana granulosa. At this weakened spot (*stigma*) the ovule and discus proligerus are situated, and they escape together when the tunica fibrosa ruptures. Thickening of the fibrous and peritoneal coverings of the ovary from inflammation (*peri-ovaritis*) sometimes pre-

vents rupture and discharge of ovule and causes dysmenorrhœa and sterility.

Mechanism of Transmission to Tubes and Uterus.—The ciliated epithelial cells in the tubes, by their lashing movement, start a current in the moisture always present on the peritoneal surface toward the uterus. The ovule is carried by this current into the tube. Sometimes there occurs external or internal transmigration; *i. e.*, the ovule enters the tube on the opposite side either through the fimbriated or the uterine extremity.

Time of Occurrence.—Usually at the height of the menstrual congestion. Intermenstrual ovulation is, however, not infrequent.

The Formation of the Corpus Luteum.—When the tunica propria ruptures, and the ovum escapes, the follicle fills with blood (the hematin of the extravasated blood giving rise to the “yellow” color). The tunica propria then enlarges by active multiplication of its cells and projects into the cavity of the follicle in ray-like folds. Shrinking and cicatrization occur, causing the permanent pits or depressions which mark the surface of the adult ovary. The corpus luteum spurium, or, better named, that of menstruation, reaches the highest period of development in from ten to thirty days. The corpus luteum verum, or, better, of pregnancy, is simply an exaggeration or further development of the corpus luteum of menstruation, the greater growth due to the increased blood supply to the whole genital apparatus. It is no longer considered of any medico-legal value. It grows for thirty or forty days after conception, then remains stationary until after the fourth month, when it begins to atrophy. At term it is only two-thirds its largest size. One month after delivery it is reduced to a small mass of fibrous tissue.

Insemination and Fertilization.

INSEMINATION.—The deposition of seminal fluid within the genital tract of a female during sexual congress.

Seminal Fluid.—A yellowish-white, opaque, sticky fluid, varying in quantity at each emission from one-fourth to two drachms, possessing a very peculiar odor, and neutral or alkaline in reaction.

Constituent Parts:—

(a) Chemical examination : Water, 82 per cent. ; salts, mainly phosphates, 2 per cent. ; proteine matter, fats, spermatin.

(b) Microscopical examination : Crystals of phosphates, spermatozoa.

Filtration shows active constituents to be the spermatic particles.

Abnormalities of Spermatic Fluid:—

(a) Aspermatism, when no discharge of fluid occurs. May be congenital, acquired or relative. Acquired when resulting from gonorrhœa, prostatic abscess, tuberculosis, neurosis. It is said to be relative when the discharge does not occur at the desired time. This variety may be due to fear (neurosis) or sexual excess, to an anatomical defect preventing emission, to defective action of the nervous centre governing the act of emission, to anæsthesia of the penis.

(b) Polyspermism—excessive quantity of fluid.

(c) Abnormalities in color : Red when tinged with blood from the mucous membrane ; yellow, with pus (gonorrhœa) ; violet, from the presence of indigo, in consequence of excessive venery ; green, when to this last there is added gonorrhœal discharge, and beer color, when jaundice is present.

(d) Oligospermism—quantity deficient, or number of spermatic particles diminished.

(e) Azoöpermism. The particles dead when emitted, or altogether absent from the fluid. A physiological absence is the rule before puberty and in old age. Gonorrhœa is most frequently the cause of acquired azoöpermism. Chronic alcoholism may produce it. It has been found that the man is at fault in about 20 per cent. of sterile marriages.

Characteristics of the Spermatic Particle:—

(a) Length, $\frac{1}{500}$ inch.

(b) Motility : Its own length in one second. Hymen to cervix in 3 hours (Marion Sims). An inch in $7\frac{1}{2}$ minutes (Henle). Can push aside epithelial cells ten times their size.

(c) Vitality or longevity : Are destroyed by *heat, cold, acid solutions, mineral poisons*, by *lack of water*. In some cases, as result of chronic disease or alcoholic or sexual excesses, they

may be dead when emitted. Solution of bichloride of mercury, 1 to 10,000, will destroy them. Under some circumstances their vitality is remarkable. They have been found alive in criminals three days dead, in a bull six days dead, in a cow six days after insemination. They remain alive for months in the bat and in the hen, for three years in the queen bee, and in the living female have been found in the cervix eight days after copulation.

Origin:—

(a) Of indifferent constituents: Cowper's glands, prostate, vesiculæ seminales.

(b) Of seminal particles: By a process similar to that in the female, the spermatoblasts undergo the changes of *karyokinesis* and extrusion of the *seminal globule*, the spermatic particles thus remaining. Their first appearance in the fluid is at the fifteenth or sixteenth year.

Mechanism of Ejection or Emission.—Muscular contraction empties the vesiculæ seminales and accelerates the passage of semen along the urethra.

Mechanism of its Reception.—From observations on the lower animals, confirmed upon the human being, the uterus, during the orgasm, becomes shorter and broader, descends into the vagina, is softer, and the os, alternately opening and closing, is observed to have a suction action, which draws the semen within the uterus.

Exceptions.—When the orgasm in the male does not occur simultaneously with that of the female the alkaline mucus in the cervix protects the spermatic particles from the acid vaginal secretion, and the seminal lake bathing the cervix allows the particles, by their locomotion, to enter the uterus. In cases where conception has followed insemination during unconsciousness, or when the semen has been deposited only on the external genitals, or when the uterus is retroverted, or in those rare cases of atresia of the vulva associated with vesico-vaginal fistula, copulation occurring through the urethra with the deposition of semen in the bladder, the reception of the particles is explained by their wonderful powers of locomotion.

Time at which Insemination is least likely to be followed by Fer-

tilization.—Seventeenth to twenty-third day after the appearance (in the three-day type) of menstruation. It is most likely to occur the first few days after menstruation.

Meeting-place of Particle and Ovule.—The general opinion is that this occurs in the ampullæ of the tubes. A more recent theory is that it takes place in the fundus of the uterus or uterine extremity of the tubes, for the following reasons: By the movement of the epithelial cilia in the tubes, and the vermiform movement of the tubes themselves, the ovule is carried to the fundus in three days. The usual discharge of the ovule is at the height of the menstrual flow; and as fruitful copulation usually occurs four to seven days after menstruation, the ovule has at this time reached the fundus.

Mechanism of Fertilization.

(a) *Attraction of Spermatic Particles Toward Ovum*.—The male elements of some plants, as ferns, are attracted by malic acid, which is excreted by the female organs of these plants. Similarly an excretion of the ovule or discus proligerus is thought to attract the spermatozoa.

(b) *Penetration of Ocular Coats by Spermatozoa*.—It is probable that normally in the human being but one particle penetrates the cell contents, thus preventing the development of twins, monsters, etc. After its entrance the particle loses its tail, thus forming the *male pronucleus*.

(c) *The Union of Male and Female Pronucleus*.

The Ovule is now fertilized or impregnated, and the subsequent changes are briefly as follows:—

1. Segmentation of the vitellus or yolk, until completely subdivided, when a mulberry-like mass is formed, called the *muri-form body*. The outermost of these spheres resulting from the cleavage are called *epiblastic*, and the innermost, *hypoblastic* spheres.

2. The epiblastic spheres arrange themselves in a layer under the wall of the ovule, thus enclosing the hypoblastic spheres, except at one point, which is called the *blastospore*.

3. The blastospore closes.

4. A fluid forms between the epiblastic and hypoblastic

spheres, and the latter collect in a mass which becomes lens-shaped and adheres to the layer of epiblastic spheres at the site of the blastospore. The fluid accumulates until the ovum has the appearance of a thin-walled vesicle, which is called the *blastodermic vesicle*.

5. Extension of the hypoblastic mass.

6. A layer of cells develops between the epiblastic and hypoblastic layers, called the mesoblast, the blastoderm now consisting of three layers, epiblast, mesoblast, and hypoblast.

7. A central thickening of the hypoblast forms an opaque, circular spot on the blastoderm, called the *embryonic area*.

8. A groove, called the *primitive groove*, appears in the embryonic area.

9. By an arching-over process, folds springing from the sides of the primitive groove (*dorsal plates*) join to form the spinal canal, and by a similar process folds springing from the base of the dorsal plates (*abdominal plates*) enclose the abdominal cavity. The cephalic and caudal extremities are formed by folds rising at either end of the groove.

From the epiblast are developed the central nervous system, superficial layer of skin, the organs of special sense; from the mesoblast, bone, muscle, connective tissue, bloodvessels, and genito-urinary organs.

From the hypoblast, the epithelium of the respiratory and alimentary tracts and glands.

The Average Date of Conception after Marriage.—Normally impregnation occurs after the first menstruation succeeding marriage, but it is customary to speak of sterile marriages only after eighteen months have elapsed.

Development of Embryo and Foetus in the Different Months of Pregnancy.

First Month.—Indistinguishable from ovum of other mammals. Is a flattened vesicle. The embryo is nourished by yolk sac which, even at the end of the first month, is larger than the cephalic extremity of the foetus. Visceral arches are distinct. Heart, first traces of liver and kidneys, eyes, rudimentary extremities, oral and anal orifices are formed. Spinal canal closes.

[Faint handwritten notes at the bottom of the page]

(Spina-bifida results if this fails to occur at this time.) Length, 1 cm., or .4 inch.

Second Month.—Grows to 4 cm. in length, and is about the size of a pigeon's egg. Visceral clefts close, except the first, which forms the external auditory meatus, tympanum, and Eustachian tube. At this time arrest of development results in hare-lip, umbilical hernia, or exomphalus. Eyes, nose, and ears are distinguishable. The first suggestion of hands and feet appear, and are webbed. External genitals also now develop, but sex is not to be differentiated.

Third Month.—Maternal blood affords nourishment; 9 cm. long and about size of goose egg. Fingers and toes lose their webbed character and nails appear as fine membranes. Points of ossification are found in most of the bones. The neck separates the head from the trunk, and sex is determined by the appearance of the uterus. Weight, 30 grms. = 460 grains.

Fourth Month.—16 cm. = 6 in. in length. Lanugo is present. Intestines contain meconium. Sex is well defined. Weight, 55 grms. = 850 grains.

Fifth Month.—25 cm. = 10 in. Vernix caseosa appears in places. The face is senile and wrinkled. Eyelids begin to open. Quickening occurs. Heart sounds are heard. Weight, 273 grms. = 8 oz.

Sixth Month.—30 cm. = 12 in. Hair grows longer. Eyebrows and lashes appear. Testicles approach inguinal rings. Weight, 676 grms. = 23½ oz.

Seventh Month.—35 cm. = 14 in. Pupillary membrane disappears. Weight, 1170 grms. = 41¼ oz.

Eighth Month.—40 cm. = 16 in. Down on the face begins to disappear. Left testicle has descended. Ossification begins in lower epiphysis of femur. Nails do not project beyond finger-tips. Weight, 1571 grms. = 3½ lbs.

Ninth Month.—45 cm. = 18 in. Subcutaneous fat increases. Diameters of the head about 1 to 1½ cm. less than at term. Weight, 1942 grms. = 4¼ lbs.

Mature Fetus.—50 cm. long. Weight, 7½ lbs. Skin is rosy; lanugo has disappeared. Nails are perfect and project beyond finger tips. Eyes are opened. The centre of ossification in the

lower epiphysis of femur is 5 mm. in diameter, while that of the cuboid bone is just beginning to show. Diameters of head are normal. Length of foot 8 cm.

Lengths and Weights of Fœtus:—

1st month,	1 cm.	.4 in.		
2d “	4	1.25		
3d “	9	3	30 grms.	460 grains.
4th “	16	6	55	850 “
5th “	25	10	273	8 ozs.
6th “	30	12	676	23½ “
7th “	35	14	1170	41½ “
8th “	40	16	1571	3½ lbs.
9th “	45	18	1942	4¼ “
10th “	50	21	3250	7½ “

Amnion and Chorion.

Amnion.

Definition.—The amnion is the innermost of the fœtal membranes, is continuous with the fœtal epidermis at the umbilicus, forming a complete sheath for the umbilical cord and forming a sac or bag in which the fœtus is enclosed.

Development.—The epiblast extends from sides, caudal and cephalic extremities of fœtus, and curving backward approaches behind same until the reduplications meet and thus form two cavities, the True and the False Amniotic Cavities. The *True* contains the liquor amnii; the *False*, the yelk sac and its vessels, which later will be constituents of the umbilical cord.

Anatomy.—Is like that of serous membrane, *i. e.*, a layer of connective tissue and a layer of endothelial cells.

Function.—Chiefly to secrete the liquor amnii.

LIQUOR AMNII.

Quantity.—One to two pints at term.

Specific Gravity.—1007.

Composition.—Water, albumen, various salts, urea, epithelium.

Reaction.—Alkaline.

Origin.—From both fœtus and mother, mainly the former.

Function.—Distends uterus and protects fœtus, affording an equal temperature for it and receiving its secretions. Does not nourish beyond adding to its supply of water.

ABNORMALITIES OF THE AMNION.

Its pathology is similar to that of all serous membranes, *i. e.*, inflammation, exudations, serous and plastic.

(A) *Abnormalities of Secretions* :—

(a) *Oligohydramnios.*—Rare ; 1 in 3000 or 4000 cases. Is disadvantageous, because walls of uterus not kept apart and fœtus apt to be injured or deformed. During pregnancy the mother is likely to suffer pain, and labor is usually difficult.

(b) *Hydramnios.*—When two quarts or more of fluid may be present. Occurs about 1 in 250 to 300 cases.

Cause.—Production may be increased ; absorption may be decreased. It may be the fault of fœtus, mother, or both. On the part of the fœtus there may be (a) excess of urine ; (b) excessive transudation of foetal serum, from vessels under placental surface, which do not disappear about the third or fourth month when hydramnios exists, or from any condition raising the blood pressure in the umbilical veins, as cirrhosis of the liver (syphilitic), an abdominal tumor, or any abnormality in vascular system of fœtus. (c) From foetal skin. A pathological condition of this is found in some cases, as nævi, elephantiasis congenita cystica. Having its origin in the mother, the hydramnios may be a part of a general dropsy or be due to an exaggerated hydræmia. Very rarely does it arise from both foetal and maternal causes, and a distinct cause cannot always be found. It is most frequently of foetal origin.

Diagnosis.—The existence of pregnancy, great movability of the fœtus, and the distention of abdomen greater than the period of duration of the pregnancy would account for, are three important signs. When there is a very large amount of fluid the diagnosis is very difficult. It may be mistaken for ovarian cyst, ascites accompanying pregnancy, distended bladder with retroversion of gravid uterus.

Classes.—*Acute.* Rare. There is a sudden transudation of fluid from some traumatism. *Symptoms.*—Pain, difficulty in respiration, at times orthopnœa, fever.

Chronic.—Begins at the third or fourth month and steadily increases, usually causing but little trouble.

Treatment.—Immediate evacuation in the acute variety ; in the chronic this is, as a rule, not required. If necessary, the life of the fœtus is not to be considered, as it will usually be diseased. Aspiration through uterine wall condemned. The membranes are to be punctured at the os, using the hand as a plug to prevent sudden escape of fluid.

(B) *Abnormalities of Color and Consistency.*—Normally slightly opaque in the latter months of pregnancy, the liquor amnii may be green or brown from the presence of meconium, or tinged with red if the fœtus is macerated.

(C) *Putrefaction of the Liquor Amnii.*—Most likely to be associated with death and decomposition of the fœtus, but occasionally there is an intensely putrid odor to the liquor amnii, with physometra, and yet the child is born alive.

(D) *Plastic Exudation.*—Usually occurs early when amnion and fœtus are near each other, and thus forms bands of adhesion between them, and even causes amputations of fœtal extremities and premature detachment of the placenta.

(E) *Abnormal Tenacity.*—Rare. The amnion may rupture and become separated from the chorion, which remains intact, forming bands or strings by being rolled upon itself. The strings thus formed may encircle the fœtus.

(F) *Cysts.*—Of no clinical importance.

(G) *Rupture.*—Abortion may result. Occasionally the amnion and chorion are perforated at a situation remote from the internal os, and the liquor amnii dribbles away for some weeks, or even months, before delivery. This is called an amniotic hydrorrhœa.

The Chorion.

Definition.—The chorion is the outermost of the fœtal membranes, and is formed from the external layer of the non-germi-

nal epiblast. The fœtus at term is surrounded by three membranes—the deciduæ, reflexa and vera (derived from maternal structures); the other two, chorion and amnion, from fœtal structures. The chorion is the median of the three membranes.

Development.—From the non-germinal epiblast, a single layer of cells springing from the outer layer of the blastodermic membrane.

Chorionic Villi.—The villi of the chorion are hollow at first, and are composed of an external epithelial and an internal mucoid layer. Later they contain bloodvessels. Until the third month these projections into the maternal tissue abstract nutriment, oxygen, etc., from the deciduæ, and serve to keep the ovum in the upper portion of the uterus. After the third month hypertrophy of one portion takes place (chorion frondosum) to form the placenta; elsewhere the villi atrophy (chorion leve). The function of the chorion leve is to protect the integrity of the ovum.

ANOMALIES OF THE CHORION.

Placenta Membranacea.—The normal atrophy of a portion does not occur, and placental villi are developed over the entire surface of the chorion. Such placentæ are thinner than the normal.

DISEASES OF THE CHORION.

(a) *Cystic Degeneration of the Villi.*—This is an hypertrophy and myxomatous degeneration of the villi with the formation of cysts varying in size from that of a millet seed to a hen's egg. The old name of hydatidiform mole is not a good one, as *mole* is a meaningless term.

Frequency.—1 in 2000.

Mortality.—Over 13 per cent.

Causes.—Diseases of endometrium, or uterine wall; circulation of villi cut off by absence of allantois or its vessels. It may occur repeatedly in the same individual.

Symptoms.—Sudden increase in size of uterus at third or fourth month usually, hemorrhage, absence of fœtus, and possibly discharge of cysts. It may be possible to feel the grape-like masses through the os uteri.

Causes of Death.—Hemorrhage, sepsis, perforation of uterus.

Treatment.—Is usually incompatible with fetal life. Hemorrhage controlled by tampon. If diagnosed early, abortion should be induced, as it assumes sometimes a malignant type and spreads to uterine wall, and thus has caused fatal hemorrhage and sepsis. This possible thinning of the uterine wall should contraindicate the use of the curette in unskilled hands.

(b) *Fibro-myxomatous Degeneration.*—Up to the present time has been found only in the placental portion.

(c) *Chronic Inflammation.*

The Umbilical Cord.

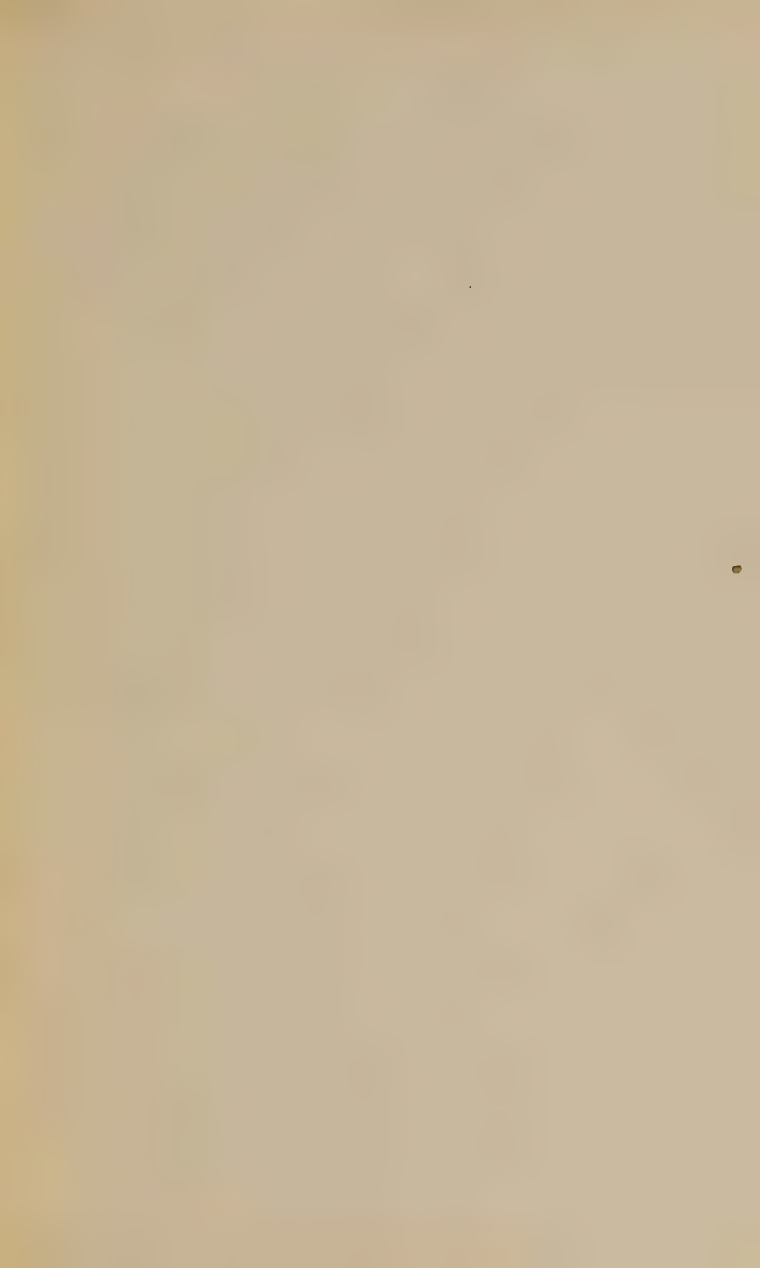
Development.—About the twentieth day after conception a diverticulum from the caudal portion of the intestinal canal is formed. It becomes constricted a short distance from its origin, the one portion to form the bladder; the other (larger) leaves the abdominal cavity with the omphalic or vitelline duct, and as an elongated cyst (allantois) rapidly grows and comes in contact with the entire chorion. Vessels soon develop, two arteries and two veins, which communicate with the villi of the chorion.

One of these veins disappears and the two arteries remain. These three vessels, with the omphalic duct, the remains of the umbilical vesicle, and the pedicle of the allantois receive a covering of mucous tissue (Wharton's jelly) and a layer of the amnion, and compose the umbilical cord. The fully developed cord at term is 20 to 21 inches in length, $\frac{1}{2}$ to $\frac{1}{2}$ inch in diameter, containing three tortuous vessels, one vein and two arteries, which possess valves.

The *umbilical vesicle* is the sac containing the nourishment of the embryo until the development of the chorion and placenta.

ABNORMALITIES OF THE CORD.

1. *Length.*—It may be very short (one centimetre), thus preventing descent of the fœtus or giving rise to hemorrhage from premature detachment of the placenta, or it may be very long (70 inches) and be found coiled around the fœtus.



2. *Thickness*.—The cord may be almost as thick as one's wrist in places, from an excess of mucous tissue, the other constituent parts being normal.

3. *Torsion*.—Eight to ten twists normal. Due to twisting of arteries around veins. Usually has no effect. If extreme the bloodvessels may be occluded. Great torsion usually occurs after the death of the foetus.

4. *The Vessels*.—There may be stenosis; atheroma; hypertrophy of valves; an overgrowth of connective tissue in the substance of the cord, as from syphilis; varicosities; rupture of the bloodvessels, forming a hæmatoma as large, perhaps, as an apple.

5. *Coils and Knots*.—Loops and true knots may be formed, which are usually not tight. Intra-uterine amputation, not due to these, but to the formation of amniotic bands. The cord is found coiled around the neck about once in every four cases. Tangling of the cords in twin pregnancies and labors is not very uncommon. It is a dangerous accident to the children.

6. *Insertion*.—(a) Central is usual. It may be (b) marginal, or (c) velamentous (when the vessels run between the amnion and chorion before entering the placenta), or (d) meso-cord, when a fold of the amnion is arranged analogous to the mesorectum.

7. *Hernia*.—Due to arrest of development of lateral plates.

8. *Cysts*.—Due to liquefaction of the mucous tissue in the cord, or to apoplexies in the cord.

9. *Calcareous Deposits*.—In the bloodvessels, or mucous tissue. Are often associated with syphilis, but of no significance.

10. *Tumors*.—Some of the above-noted conditions are the cause of localized swellings: rarely a low-grade foetus amorphus may be attached to the cord so intimately as to look like a tumor in its substance.

The Decidua.

Development.—After the ovum is impregnated the mucous membrane of the uterus hypertrophies to tenfold its normal thickness, due to proliferation of young connective-tissue cells

above the uterine glands. These proliferated cells are called "decidual cells." The ovum, lying in the folds of the hypertrophied mucosa, finally is completely surrounded.

That portion of the mucous membrane reflected over the ovum is the *decidua reflexa*. The portion under the ovum, the *decidua serotina*, and the uterine mucous membrane elsewhere, the *decidua vera*.

The decidua serotina helps to form the placenta; the decidua vera undergoes a partial atrophy in the latter months of pregnancy and is cast off in part with the ovum in labor, in part by disintegration in the lochial discharge; the decidua reflexa begins to undergo degeneration at the second month and by the seventh month has disappeared.

DISEASES.

1. *Apoplexies*.—These are a common cause of early abortions, and are apt to occur prior to the second or third month. *Causes*.—Bright's disease, repeated congestions from frequent coitus, injuries, blows, etc.

2. *Inflammations, Chronic*.—(a) Hyperplastic endometritis gravidarum. The hypertrophy of the mucous membrane is exaggerated, deflects nourishment to itself and gives rise to apoplexy and early abortion of a fleshy mass. It is usually the result of chronic endometritis prior to pregnancy. The decidual apoplexies may be multiple and distributed all over the surface of the ovum, projecting into its cavity, producing the so-called "subchorial tuberos hæmatomata of the decidua." (b) Polypoid endometritis gravidarum. The hypertrophy confined to certain areas. Is very rare. Leads to abortion, second to fourth month. (c) Catarrhal endometritis gravidarum. There is an abnormal hypertrophy of the uterine glands, giving rise to the secretion of a few ounces to a pint or more, with periodic discharges, of thin mucus, called hydrorrhœa gravidarum. (d) Cystic endometritis gravidarum occurs very early. The glands hypertrophy. May be cured by subsequent growth of the deciduæ or may continue to produce hydrorrhœa gravidarum.

3. *Inflammations, Acute*.—(a) Hemorrhagic endometritis, as

occurs in cholera. Causes abortion. (b) Exanthematous endometritis, the exanthema developing on the uterine mucous membrane, as on other mucous membranes. In several reported cases of measles complicating pregnancy, abortion has occurred about the time of appearance of the eruption. (c) Purulent endometritis. Very rare.

4. *Atrophy*.—May affect either of the deciduæ. Ill-developed placenta may result, or ovum not properly held in place may drop and develop a “*cervical pregnancy*.”

5. *Tumors*.—Decidual polyps of fibrin on a basis of decidual tissue, like stalactitic formation on rocks. “*Deciduoma*,” a tumor composed of decidual elements, remaining, perhaps, a long time in utero, occasioning hemorrhage, discharges, and, perhaps, sepsis, but so lightly attached to the uterine wall that its removal is easy. Another variety of deciduoma (deciduo-sarcoma) is malignant, giving rise to metastases and ending fatally six or seven months after confinement.

The Placenta.

(A) *Development*.—At the third month the chorion villi atrophy, except at the decidua serotina, where they take on an extraordinary growth to form the placenta. Each villus is composed of connective tissue holding capillary bloodvessels, is covered with epithelium, and projecting into the maternal tissue is surrounded by a capillary network from the maternal bloodvessels. Later, these capillary networks disappear, leaving large sinuses or lacunæ, which receive blood from the little curling arteries rising up through the decidua serotina and into which the villi of the placenta dip.

(B) *The Fully Developed Placenta*.—At term the placenta weighs one pound, is one inch thick at its central portion and seven inches in diameter. The fœtal side is covered by the amnion and penetrated by the cord. The maternal surface is dark red, divided by sulci into lobules or cotyledons and covered with a grayish transparent membrane composed of the cells of the upper layer of the decidua serotina. It is normally situated at the fundus, anteriorly or posteriorly.

(C) *Functions*.—It absorbs oxygen and nutriment, acting as vicarious lung or gill, and serves as alimentary tract, kidney, liver, and bowel.

The epithelium of the villi, in carrying on these functions, has a selective power. Variola germs are readily absorbed, tuberculosis very rarely.

ANOMALIES.

- (a) *Position*—as placenta prævia.
- (b) *Size*—as placenta membranacea.
- (c) *Shape*—as horse-shoe placenta.
- (d) *Weight*—may be above or below normal.
- (e) *Number*—as placenta duplex, tripartita, etc. There may be accessory growths, as placenta succenturiata, placenta spuria, marginata, etc.

DISEASES.

(a) *Edema*.—Often accompanies hydramnion and macerated fœtus; stenosis of umbilical vein; general effusions in the mother. The villi may be normal.

(b) *Degenerations*:—

1. *Cellular Infiltration*.—Occurs in syphilis. Villi are distended with granulation cells, bloodvessels obliterated, and fœtal life perishes.

2. *Fibrous and Fatty Degeneration of Villi*.—Causes. Any abnormality, accident or disease of placenta abrogating its function, as hemorrhage from the placenta, chronic interstitial placentitis, diseases of endometrium.

“White infarcts” and fibrin nodes of the placenta, formerly believed to be pure fibrin formations, are probably localized degenerations of the decidua.

Prognosis.—If extensive, fœtus dies. If small, a corresponding degree of ill development of fœtus. Primary fatty change only occurs after death of the fœtus.

3. *Phthisical Placenta*.—An exudate from villi into lacunæ, which undergoes a cheesy change.

4. *Calcareous*.—Very common. Occurs in indifferent places, and has no effect on functions of the placenta.

5. *Myxomatous*.—Similar to the same change in the chorion. Is usually localized.

(c) *Apoplexies*.—Very common. Are a frequent cause of abortion. Usually on the maternal face of, or in, the placenta. Rarely subamniotic, and consequently of foetal origin. The foetus may thus bleed to death.

Causes.—Traumatism, maternal diseases (especially Bright's disease), foetal diseases.

(d) *Syphilis*.—It is disputed whether there be a distinct form of the disease in the placenta which offers a diagnosis of syphilis. Prof. Hirst inclines to the belief that there is this distinctive form of placental disease. The pathological manifestations differ with the time of infection, as follows:—

1. When the spermatic particle is diseased there is cellular infiltration of villi.

2. When the mother is infected during fruitful coitus, there is, in addition to the cell infiltration, an overgrowth of connective tissue over the cotyledons.

3. When the mother is infected before conception, gummata appear in maternal tissue.

4. When the mother is infected after conception, the placenta is ordinarily not diseased (Fränkel).

Prognosis.—For foetus: the cell infiltration destroys the blood-vessels and foetal life perishes. For the mother: not indifferent. From the connective-tissue development adherent placenta likely to occur, increasing the risk of sepsis, hemorrhage, inversion of uterus, etc.

(e) *Acute Placentitis*.—Very rare.

(f) *Cysts*.—Result from old hemorrhages. Are never large and of no clinical importance.

(g) *Tumors*.—1. Fibroid change or Myxoma Fibrosum; 2. Localized Hypertrophies; 3. Organized Thromboses. There may remain in the uterus after delivery fragments of placenta, on which, as a basis, fibrin and blood collects until a large polypoid tumor is developed. Rarely a "destructive placental polyp" grows into the uterine wall in a malignant fashion, with a fatal termination.

Physiology of Mature Fœtus.

Fœtal Circulation.

From the placenta the blood passes through the umbilical vein to the under surface of liver. A part enters the liver and is carried to the ascending cava by the hepatic veins, the smaller portion passing direct to ascending cava through the ductus venosus. Joining the blood from the lower extremities it then passes to the right auricle, and guided by the Eustachian valve enters, through the foramen ovale, the left auricle. Thence to left ventricle, to aorta, the greater part being carried to upper extremities and head. Returned by the descending cava to the right auricle, it passes to the right ventricle, and a small portion being carried to the lungs through the pulmonary artery, the remainder reaches the aorta through the ductus arteriosus. From the aorta it passes through the hypogastric arteries, to the umbilical arteries, to the placenta, a small portion of this mixed blood being carried by the aorta into the lower extremities.

Fœtal Excretions.

Bowels.—Inactive during intrauterine life. Meconium is discharged if fœtal life is threatened, as by an apoplexy, coiled or compressed cord, etc. If it occur during labor, should always be a danger signal except in breech presentations.

Bladder.—Is evacuated during intrauterine life and urine is always albuminous. The urinary secretion is not essential to the development of the fœtus.

If the fœtus has lived a few hours, the kidneys will show orange-colored infarcts of urates, which are of medico-legal value.

Multiple Impregnation.

Frequency.—

Twins,	1 in	89 births.
Triplets,	1 “	7,900 “
Quadruplets,	1 “	371,126 “

These statistics are from European sources, and will not hold

good for this country, where multiple pregnancies are less frequent.

Two cases have been reported—one in Italy, the other in Texas—of six children at a birth.

Twins.—How it occurs.

1. Two ovules discharged at once from separate Graafian follicles in same or different ovaries.

2. Two ovules from same follicle.

3. Unioval, *i. e.*, from a single ovule two fœtuses developed by a division of the layers of the early formed membrane. Unioval twins have single placenta and chorion, but two amnions; otherwise each fœtus has its own placenta and chorion, as well as amnion. The ova lie side by side, one in front of the other, or one above the other.

Prognosis.—Mother—Liability is greater to albuminuria and eclampsia, to post-partum hemorrhage from over-distention, and labor is apt to be long and difficult.

Fœtus.—Much graver. If from two ovules, one in twenty-three born dead; from a single ovule, one in six.

Reasons for gravity of prognosis to fœtus:—

1. Lack of room, hence ill-developed; under weight and size.

2. If one is stronger and better developed it attracts more nutriment, and finally crowds and compresses its fellow, flattening it out (Fœtus Papyraceus).

3. In unioval the anastomoses between fœtal and placental vessels apt to produce monsters.

4. Hydramnios apt to occur.

5. Many complications at birth.

It is possible for one of twins to be discharged prematurely, perhaps early in pregnancy, while the other goes on to mature development. It is also possible for one to die, and even to putrefy in utero, while the other remains healthy.

Super-Impregnation.

(a) *Super-fœtation.*—The product of conception occupying the uterus, a second impregnation follows a subsequent coitus.

(b) *Super-fecundation.*—Two or more ovules fecundated at or near the same period of time.

The possibility of its occurrence after a long interval doubted, since there is no proof of ovulation during pregnancy. The limit is within a few days. The absence of menstruation during pregnancy is explained by the following: hypertrophy of decidua and bloodvessels surrounded by organized tissue preventing diapidesis; absence of periodic engorgement, shown by lack of ovulation; obliteration of uterine cavity after the third month.

Determination of Sex.—At birth the proportion is 106 boys to 100 girls. At puberty it is about equal.

Theories.—None satisfactory. The parent possessing the greater mental, physical, and sexual development may have some influence.

When determined.—Not known. Up to the third month embryo has equally the elements of both sexes.

Diseases of the Fœtus in Utero.

Mortality.—One-fourth of all die before term.

Deformities and Monstrosities.

Every departure from the normal is classified under one of the following:—

1. Hemiteratic.
2. Heterotaxic.
3. Hermaphroditic.
4. Monstrous.

1. *Hemiteratic*, semi-monster—*i. e.*, an approach to monstrosity—include:—

Anomalies of (a) *growth* (as dwarfs, giants).

“ (b) *volume* (as microcephalic head, large breast, etc.).

“ (c) *form* (as deformity of pelvis).

“ (d) *color* (as albinism, melanism, mole, etc.).

“ (e) *structure* (as abnormal ossification of cartilage).

“ by (f) *displacement of splanchnic organs* (as hernia, spina bifida, encephalocele).

“ by (g) *displacement of non-splanchnic organs* (as club-foot, scoliosis, bow-legs).

“ by (h) *change of connection* (as anomalous attachment of muscles, tendons, nerves).

Anomalous (i) *openings* (as patulous foramen ovale, rectum opening into urethra).

“ (j) *imperforations* (as rectum, vagina, œsophagus).

“ (k) *union of organs* (as horseshoe kidney, webbed fingers).

Anomalies by (l) *disjunction* (as hare-lip, cleft-palate).

“ (m) *numerical diminution* (as absence of one or more fingers).

“ (n) *augmentation* (as six fingers, three testicles, six toes).

2. *Heterotaxic*.—Anomalous order, reversal of natural position of organs, as liver on left side, pyloric and cardiac ends of stomach reversed.

3. *Hermaphrodisism*.—A vicious conformation of the genital organs comprising elements of both sexes. When called upon to make the diagnosis always exclude an ill-developed male, as cleft scrotum, or rudimentary penis. By this error males have been educated as females.

4. *Monstrosities*.—A living creature so much deformed as to excite wonder or disgust.

(A) *Autositic Monsters*.—Those capable of independent existence. These are further subdivided and etymologically named:—

(a) *Ectromelic* (abort-limb). Absence of upper or lower extremity.

(b) *Symelic* (union-limb). Lower limbs fused.

(c) *Celosmatic* (hernia-body). Extreme hernia.

(d) *Exencephalic*. Brain normal, but cranial bones not developed.

(e) *Pseudencephalic*. Bones of cranium lacking and rudimentary brain.

(f) *Anencephalic*. No brain and no development of cranium.

(g) *Cyclocephalic*. The two eyes fused. Reversal of eyes and nose apt to occur (*rhinocephalic*).

(h) *Otocephalic*. The two ears meet under chin, and lower portion of face not developed.

(B) *Omphalositic*.—Possessing an imperfect kind of life, which ceases when the umbilical cord is divided. It only occurs in twin pregnancy; the intimate anastomosis of vessels in unioval sometimes allows one heart a preponderating power, and the other, not used, atrophies. These may be

(a) *Acardiac*.

(b) *Acephalic*.

(c) *Asomatic*.

(d) *Fœtus amorphus* or *anideus* (a shapeless mass of flesh).

(C) *Composite Monsters*:—

(a) *Double autositic*. Named by the portion of the body which unites them, as *xyphopagic* (joined by xyphoid), *synsomatic* (joined by bodies), *syncephalic* (joined by heads), etc.

(b) *Double parasitic*, as an extra pair of legs, extra child hanging from abdomen, etc.

(c) *Triple monsters*. Very rare.

Diseases of Fœtus.

Infectious—*Causes*.—Specific microorganisms which in some way pass through maternal blood to fœtus. The conclusion from many conflicting observations is that this is not invariable, but possible. Several theories have been advanced to explain how the microorganisms reach the fœtus.

The following are some of the diseases which have been found in the fœtus: smallpox, measles, crysipelas, typhoid, pneumonia, cholera, syphilis, malaria, recurrent fever, yellow fever, leprosy, anthrax. The power of various organisms to transmit themselves is not equal. Small-pox very apt to pass from mother to fœtus; tuberculosis, but one case reported. Even if fœtus is not inoculated, abortion is apt to occur.

Congenital Skin Diseases—as ichthyosis.

Intra-cranial Disease—as sclerosis or tumors of brain, etc.

Inflammation, recent or old, of Serous Membranes—ascites, hydrothorax, hydrocephalus.

Valvular Diseases of Heart.

Overgrowth of Connective Tissue—in intestines, bloodvessels, liver, etc. (largely due to syphilis).

Tumors—as distended bladder, congenital goitre, sacral tumors, etc.

Rachitis.—Signs of congenital rachitis—head square and bent to one side, spine tortuous, joints enlarged, pigeon breast, curved long bones.

Anasarca—usually due to obstruction of the circulation, or pathological alteration of the blood (leukæmia, anæmia).

Congenital Cystic Elephantiasis.—Multiple cystic tumors of skin, with thickening; great enlargement of lymph channels and bloodvessels.

Spontaneous Fractures of the Long Bones—most commonly due to rachitis, and then apt to be multiple.

Anchyloses and Luxations.—Anchyloses are very rare, are due to inflammation of the joint membranes and seriously prevent normal mechanism of labor. Luxations are rarely intrauterine, but frequently the result of mismanaged breech and arm presentations when much force is used. A rigidity of the muscles due to prolonged pressure may be confounded with the above.

Intrauterine Amputations—caused by amniotic bands.

External Violence—of medico-legal interest.

Maternal Conditions affecting Fœtus :—

1. *Nervous Disturbance in the Mother*.—Maternal impressions; emotions (sometimes fatal).

2. *Abnormalities in Temperature*.—Fœtus not necessarily affected if maternal temperature be raised *slowly* to 105°–107°. It will be, however, if the rise be sudden. Always fatal at 109°.

3. *Defective Nutrition*.—Serious chronic diseases producing anæmia; pernicious vomiting of pregnancy.

Treatment.—Remove cause. Iron, arsenic, good hygiene.

4. *Diseases of the Endometrium, the Womb, and its Adnexa*.—Usually cause abortion.

5. *Alterations in the Maternal Blood Pressure*.—Fatal to embryos of animals.

6. *Poisons in the Maternal Blood*.—The infectious diseases; eclampsia; saturnism; bile salts.

7. *Heredity*.—A predisposition to disease acquired in utero.

8. *Maternal Death*.—Fœtus has been found alive as long after death of mother as two hours.

Diagnosis of Fœtal Death:—

1. Absence of heart sounds and fœtal movements.
 2. Palpation of macerated skull (crepitus).
 3. Temperature in cervix (death likely if not 1° above body temperature).

4. Hand in utero to feel for heart pulsation.

5. Peptonuria.

6. Cessation of growth or diminution in size of uterus.

7. Disturbances of renal functions.

8. Disappearance of subjective signs of pregnancy.

9. Appearance of milk secretion.

The effects of fetal death upon the mother are practically nothing so long as the membranes are unbroken.

Changes in Structure of Fœtus after Death.—May be any of the following:—

1. *Maceration*. The physiological activity of the skin having ceased, the vernix caseosa is no longer supplied to protect the fetus from the macerating influences of the liquor amnii.

2. *Putrefaction* (only after membranes are broken). The accumulation of gases from putrefactive change is called tympanites uteri or physometra.

3. *Saponification*.

4. *Mummification*. Occurs sometimes after missed labor.

5. *Calcification*. Lithopædion produced as in extra-uterine pregnancy.

6. *Absorption* (before third month). A very favorable termination in extra-uterine pregnancy. It may also occur in intra-uterine pregnancy.

Syphilis of Fœtus.

Infection of fetus occurs in three ways:—

1. From diseased Ovule.

2. From diseased Spermatic Particle.

3. From Maternal blood. The embryo will be syphilitic in

about one-fourth of the cases in which the mother has been infected after conception has occurred.

The poison can also pass from fœtus to mother, thus explaining several curious phenomena, as the appearance of secondary symptoms in the mother in the latter months of pregnancy, without the history of a primary sore.

Manifestations.—Protean and polymorphous, as in the adult, although it should be remembered that the characteristic signs in the living infant do not usually develop before four to six weeks. There may be an overgrowth of connective tissue in all organs of the body.

(a) *Skin.*—Pemphigoid eruption, especially on soles of feet and palms of hands.

(b) *Bones.*—An embryonal tissue, a transition stage between cartilage and bone, by a premature attempt at ossification, is not sufficiently nourished, dies and undergoes a fatty change, leaving between diaphysis and epiphysis of all the long bones a *jagged yellow line*.

(c) *Liver.*—Normally is $\frac{1}{30}$ of body weight. Syphilis of fœtus shows liver much increased in size and weight.

(d) *Spleen.*—Normally $\frac{1}{300}$ of body weight. Much increased in syphilis.

(e) *Lungs.*—One of three conditions found :—

1. Overgrowth of connective tissue, constituting fibroid pneumonia or phthisis (most common).

2. Catarrhal or White Pneumonia. By an overgrowth of epithelium in the air-vesicles the lung dies, fatty degeneration follows, giving the lungs a dead-white appearance, with imprint of ribs.

3. Gummata—rarest.

Effect of Syphilis upon Life of Fœtus.—"In 83 per cent. of all habitual foetal deaths the parents are syphilitic. In 657 pregnancies in syphilitic women 35 per cent. ended in abortion, and a large number of the children expelled at term were stillborn (Charpentier). Of 414 pregnant women with syphilis only 63 per cent. arrived at term." Of 100 syphilitic mothers only 7 children were living after 3 months.

Diagnosis.—By history of father or mother, and by an examination of skin, long bones, liver, spleen and lungs.

Treatment.—Syphilitic patients should not be allowed to marry without a prolonged course of treatment (for a year), to be followed by a mild treatment of the mother throughout pregnancy. In married people sexual intercourse should be interdicted, to avoid abortion, during the treatment. The time that must elapse after parents are affected before fœtus may be expected to be free from the poison varies. In one case after twelve years the fœtus was syphilitic. If the mother is contaminated at the fruitful coitus, or before, treatment should be begun at once. Both mercury and iodide of potash can pass to the fœtus and modify its syphilitic disease. Chlorate of potash (10–20 gr., t. d.) may be given in any disease interfering with the development of the placenta, to supply oxygen, as recommended by Penrose, Sir J. Y. Simpson, Barker, Bruce, and others.

Habitual Death of Fœtus.

Causes in order of frequency :—

1. *Syphilis.*—Eighty-three per cent. of all cases of habitual fœtal death.
2. *Metritis, endometritis, and uterine displacements.*
3. *Alterations in maternal blood, as anæmia or plethora.*
4. *Chronic diseases of the mother.*—Tuberculosis, cancer, malaria, diabetes, nephritis. (In nephritic mothers 86 per cent. of children are born dead or too feeble to survive long.)
5. *Causes resident in fœtus, as recurring deformities.*
6. *Chronic poisoning.*—Saturnism. Tobacco. (In the Virginia factories such effects not noticed.)
7. *Causes referable to father, as phthisis, albuminuria, chronic poisoning.*
8. *Habit and heredity.*

Treatment.—Ascertain cause, and treat that.

Physiology of Newborn Infant.

Respiration.

Two factors to explain its establishment :—

1. External irritation, resulting from change of environment (from liquid, with temperature of 99° , to air, with temperature of 70°), gives rise to reflex action of all muscles.

2. Maternal supply of oxygen being cut off, there is an accumulation of CO_2 , and the primary action of this is stimulant to respiratory apparatus. This cause may be operative in utero and determine intra-uterine respiration, with the inspiration of liquor amnii, meconium, mucus, and blood-clots, and a consequent pneumonia. If the membranes are ruptured and there is free access of air to the uterine cavity, there may be a comparatively normal respiration for a while in utero, and the child may even be heard to cry aloud within the womb.

Rate of respiration is 44, sinking, after a few months, to 35.

Weight.

7.3 lbs. There is a gradual increase, about one-and-a-half pounds before and one pound after the fourth month, for each month.

Month.	Weight, lbs.	Month.	Weight, lbs.
1	7.75	7	16
2	9.5	8	17
3	11	9	18
4	12.5	10	19
5	14	11	20
6	15	12	21

Digestion.

Accomplished by digestive juices, except the diastatic ferment of the pancreas and salivary secretion.

Partially dependent upon bacteria in stomach and intestines.

Capacity of Stomach.—Knowledge of this important to avoid over-feeding.

1st week,	46 cub. cent.	3d month, 140 cub. cent.
2d “	78 “	5th “ 260 “
3d and 4th week, 85	“	9th “ 375 “

The greater the weight the greater the gastric capacity. One one-hundredth of body weight + 1 gramme each day (Ssnitkin). One ounce at birth and an increase of one ounce per month up to the sixth month, after which it is somewhat less (Emmet Holt). The time required to digest this amount of food is one to two hours.

Position of Stomach.—Its axis is almost longitudinal, which explains frequent regurgitation and vomiting. It is high on left side under the false ribs. This explains presence of air in the stomach.

Excretions.

(a) *Urine.*—Always albuminous for first few weeks. Quantity has never been estimated. Always acid. Specific gravity 1003-5. A trace of sugar is often found in breast-fed babies. Voided 6-20 times in 24 hours. Does not always stain diapers, and mistake may thus be made of supposing none to have been voided. (b) *Bowels.*—Meconium for the first 48 hours. Later, it becomes light yellow, is not formed, is sour and acid. The normal frequency of evacuation is four times in 24 hours.

Temperature.

Peculiarities are *irregularity* and *height*, with the variations above 98°. Slight causes will produce great changes.

Eyesight.

Always hypermetropic.

Pulse.

125-160, as shown by heart sounds.

Blood.

Total bulk to body weight 8 per cent. ; six to seven millions red blood-corpuscles to the c. m., which are more spherical and do not tend to form rouleaux. Shadow corpuscles abundant. White blood-corpuscles more numerous, viscid, and deliquescent

than in adult. The ordinary jaundice of the newborn infant is due to the superabundance of red blood-corpuscles which are destroyed in the liver, giving rise to an excess of bile pigment. It is reasonable to suppose that it is also hematogenic, the destruction of the red blood-corpuscles setting free hæmoglobin in the blood. The foetal blood contains a large amount of hæmoglobin. At birth there is 120.2 per cent. compared with 93.8 per cent. in mother, and this increases for 36 to 48 hours, then diminishes.

Liver.

Blood supply diminished, capillaries less distended, secretion of bile lessened. Lower pressure in hepatic veins. Capsule of Glisson swollen, associated with exfoliation of the cord.

Heart.

Exhibits transition from foetal to infantile circulation by closure of foramen ovale and obliteration of ductus arteriosus.

Cord.

After 24 hours, line of demarcation at its base. Necrosis of amniotic covering. Mummification of mucous tissue. Destruction of its vessels. Cord drops off about 4th day, followed by retraction of granulating button within the umbilical ring.

Medico-Legal Points.

It is impossible to definitely determine whether child has lived and whether injuries on its body have been inflicted with murderous intent. Discoloration about the neck points strongly to strangulation.

Anatomical Points.

To be borne in mind when making autopsies to determine cause of death of newborn infant.

The normal relatively large size of *thymus gland* and *heart*. An enlarged thymus may completely close the trachea. *Lungs* should be inflated and overlap heart. *Liver*, $\frac{1}{30}$ of body weight. *Ductus choledochus* should be patulous. The *sigmoid* and *appendix* very large and the *bladder* relatively large. Examine hypo-

gastric arteries for septic infection. To facilitate an examination of the opening of the air-passages and the œsophagus make incision splitting lip, symphysis of lower jaw and tongue.

Abnormalities in the Physiology of Premature Infants.

The two main deviations are—

(a) Low temperature—variations below 98°.

(b) Inability to ingest and digest food.

Treatment.—Incubation and gavage. In the absence of the most approved incubator, such as Tarnier's, one can be readily improvised with an ordinary baby bath tub, several layers of cotton-wool, and a number of beer bottles filled with hot water. Gavage is the regular feeding of the infant with freshly-drawn mother's milk through a small soft catheter passed into the stomach at each feeding.

Mortality of this Treatment:—

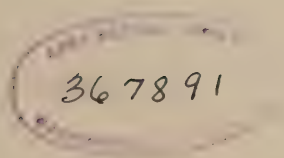
At 6 months 22 per cent. saved.					
" 7	"	38	"	"	
" 8	"	89	"	"	
" 8½	"	95	"	"	

Sclerema. A disease only found in these premature infants. Occurs most often in lying-in hospitals. The most prominent symptom is a hardening of the skin, beginning in the legs and spreading, usually sparing breasts and belly. Jaundice or a hemorrhagic condition usually accompanies it. Temperature is very low, 95°. Its pathology is not well understood. The most probable explanation is that the large excess of palmitic acid in infants solidifies at this low temperature. The condition is a grave one and apt to be fatal.

Management of Newborn Infant.

Clothing.

A baby should be clothed in winter as follows: A binder, of flannel or knit wool, twice around abdomen, a knit shirt, diaper, knit shoes, and two skirts, the first flannel (in midsummer, linen), and finally its dress. The skirts should be supported from the



367891

shoulders by sleeves or tapes. A knit jacket may be worn over the dress. A light flannel shawl or cap is desirable to protect the child from attacks of coryza.

As an infant usually urinates very frequently, the diapers are changed about 20 to 24 times a day. To prevent chafing one of the following powders should be used: Compound talcum, borated talcum, oxide of zinc, and lycopodium, rice flour. If chafes occur, cold cream is the best simple remedy.

Feeding.

HUMAN MILK. Secretion established at the end of forty-eight hours. Derives its origin from an overgrowth of epithelial cells lining the glands, their infiltration with fat, and subsequent rupture. Specific gravity, 1024–35, reaction alkaline. Each minute fat globule is surrounded by a pellicle of serum albumin.

CHEMICAL CONSTITUTION.

	Meigs.	Vogel.	Gautrelet.
Water	87.163	89.5	88.1
Fat	4.283	3.5	4.0
Casein	1.046	2.0	2.2
Sugar	7.407	4.8	6.2
Ash	0.101	0.17	0.5

Fat.—This constituent of human milk is subject to rather wide variations in quantity under the influence of diet and general health. Under normal conditions, however, it stands pretty constantly at 4 per cent.

Proteids of Milk.—The proteids of milk are casein and lact-albumin.

Casein.—Casein is, strictly speaking, the curd of milk, formed by a digestive ferment acting upon “caseinogen,” a proteid analogous to fibrinogen, myosinogen. Caseinogen is a peculiar substance, neither an alkali-albumin nor a globulin, but occupying a distinct position among proteids.

Lact-albumin.—A proteid resembling closely serum albumin, but somewhat different from it. It is present in small quantities— $\frac{1}{2}$ of 1 per cent. When the milk is curdled a new proteid

appears in whey, called "whey proteid," which is soluble and non-coagulable by heat.

Sugar.—This is lactose ; it is not strong in sweetening properties.

Ash.—The ash of human milk is made up mainly of potassium, sodium, calcium, and phosphoric acid.

Quantity of Milk at each Nursing.—Rather difficult to determine. It may be estimated by : (1) *The infant's gain in weight after each feeding.* This is not constant, varying from 3 to 6 ounces. (2) *Capacity of stomach* (see page 44). (3) *Quantity in 24 hours, divided by the number of nursings.* At the end of the 7th day the quantity in 24 hours is 14 ounces ; at the end of the 4th week, 2 pints.

Factors Influencing Secretion—(a) *Quality.*—The quantity of fat experiences the greatest variations.

1. *Time.*—The quality of the milk varies with the time at which it is withdrawn. There is a difference between what may be called the fore milk, middle milk, and strippings. The middle milk should be selected for chemical analysis, as it will give the average proportion of the several constituent parts.

2. *Intervals between the Nursings.*—When the infant is fed too frequently the milk becomes more concentrated, contains less water, and its specific gravity is higher.

3. *Diet.*—The quantity of fat is increased by a nitrogenous diet. If the mother eats too little albuminous food, or too little fat, the milk is poor in fat. If the diet contain too much meat, fat, or malt liquor, it will have an excess of fat, which the infant cannot digest. The proper diet does not differ from the ordinary diet. The quantity of casein, which is more commonly in excess in the better class, can be reduced by regular exercise. Cutting down the diet will not suffice ; it reduces the whole quantity, but not the proportion of casein.

(b) *Quantity.*—This may be improved by the addition of a half pint of milk, to be taken at eleven and four o'clock, and to some a half pint of malt liquor may be given at dinner, watching its effect upon the child. Always see that the nurse does not interfere with the diet.

Conditions Interfering with the Mammary Function.—(a) *Atrophy of glandular elements and overgrowth of connective tissue*, as from ill-developed physique, pressure of corsets, refusal to nurse, etc.

(b) *Diseases.*—Any acute, infectious disease, as the exanthemata, erysipelas, diphtheria, typhoid, mammary abscess. When convalescence is once fairly established, even after several weeks, the milk supply will usually return, when the child should be transferred from its bottle to the breast. In phthisis the quantity is not often affected, but the quality is impaired. There is apt to be less fat and casein, and the milk may contain the tubercle bacillus. A syphilitic mother should not nurse her child, for fear of infecting it, if it be not already infected, but a syphilitic child may be suckled by its mother without danger of her infection (Colles' Law). Any disturbance of maternal health may cause the reappearance of the colostrum corpuscles, with ill effect upon child. They should not be found normally after the eighth or tenth day. The possibility of their reappearance is of medico-legal interest.

(c) *Hemorrhage*, as when much blood is lost during the puerperium, or by the early return of profuse menstruation. Nursing is not interfered with if the hemorrhages in the latter are not profuse.

(d) *Emotions.*—How these affect the milk is not yet explained—possibly by the production of leucomaines. When the mother is influenced by profound emotions, her milk may become even poisonous to her child.

(e) *Drugs.*—The following drugs have been demonstrated in the nursing child's system after administration to the mother: Sodium salicylate, potassium iodide, salts of mercury, opium, chloral, and atropia. The last is particularly likely to affect the child, and should be administered with caution.

If the mother cannot nurse her child, it should be fed by a wet nurse.

SELECTION OF WET NURSE.

This should be governed by the following considerations:—

(a) She should have *milk of good quality*, which is best judged by the appearance of her own child.

(b) She should, preferably, be a multipara, and of *suitable age*; her child approximately the same age as the one to be nursed; nipple should be well shaped; and it is of advantage to have made a chemical analysis of her milk.

(c) Equable disposition and absence of disagreeable qualities.

(d) She should not have syphilis.

ARTIFICIAL FEEDING.

Asses' and goats' milk are more like human milk than is cows' milk, but as they are not conveniently procurable the last is used. To properly appreciate why so large a proportion of artificially-fed children die annually, particularly in the hot summer months, it is only necessary to study the differences between cows' and human milk. The most important differences may be briefly tabulated as follows:—

(1) *Gross Appearances*.—Cows'—a dead white in color, and opaque.

Human—apt to be yellow; sometimes bluish. More translucent.

(2) *Reaction*.—Cows'—acid. Human—alkaline.

(3) *Specific Gravity*.—Cows'—1030–35. Human—1024–35.

(4) *Curd Comparison*.—The coagulum produced by a digesting ferment, as rennet, is dense, tough, and digested with difficulty in cows'; light, flocculent, and easily digested in human.

This difference is due merely to the larger quantity of caseinogen in cows' milk, and to the acidity. Dilute cows' milk and make it alkaline, and the curd on the addition of rennet is as light and flocculent as in human milk.

(5) *Chemical Comparison*.—Cows' milk contains more casein and less sugar.

COMPARATIVE ANALYSES.

	MEIGS.		VOGEL. LEHMAN.		GAUTRELET.	
	Human.	Cows'.	Human.	Cows'.	Human.	Cows'.
Water	87.16	87.1	89.5	87.5	88.1	85.61
Fat	4.28	4.20	3.5	3.5	4.0	4.0
Casein	1.04	3.25	2.0	3.5	2.2	3.5
Sugar	7.40	5.	4.8	4.8	6.2	6.
Ash	0.10	0.52	0.17	0.75	0.5	0.85

(6) *Histological Comparison*.—It is asserted that the albuminous envelop surrounding the fat globules is thicker and tougher in cows' milk. Colostrum corpuscles are found in human milk, normally, up to the eighth or tenth day. They return under influences interfering with lactation, as described above.

(7) *Bacteriological Comparison*.—Human milk comes from the breast sterile. Cows' milk in cities, particularly in hot weather, after twenty-four hours, swarms with all kinds of pathogenic and non-pathogenic micro-organisms and their products—ptomaines. Tyrotoxicon is the most virulent ptomaine found in milk.

(8) *Quantitative Comparison*.—Human milk is furnished in quantity and at intervals suitable for the infant. Artificially fed children are apt to be over-fed.

PREPARATION OF AN ARTIFICIAL FOOD.

In making an artificial food with cow's milk as a basis, three factors must be borne in mind: the quantity required, the differences in chemical composition and reaction, and the microbe infection. The first may be regulated by the following table, based upon an extensive study of the capacity of the infantile stomach:—

Age.	Interval.	Number of feedings in 24 hours.	Amount of food at each feeding.	Total amount in 24 hours.
1st week . . .	2 hours.	10	1 oz.	10 ozs.
2d to 4th week .	2 “	9	1½ ozs.	13½ “
2d to 3d month .	3 “	6	3 “	18 “
3d to 4th month	3 “	6	4 “	24 “
4th to 5th month	3 “	6	4-4½ “	24-27 “
6th month . .	3 “	6	5 “	30 “
8th month . .	3 “	6	6 “	36 “
10th month . .	3 “	5	8 “	40 “

The difference in chemical composition and reaction may be removed by diluting the whole to reduce the casein, adding fat

and sugar, and making alkaline. The microbe infection of cows' milk may be obviated by sterilization. The following formula accomplishes these purposes :—

TO MAKE 2 OUNCES.

1. Have ten bottles prepared clean every morning.
2. Put in each of them, through a clean glass funnel :

Cream	dr. iv.
Milk	dr. ij.
Water	oz. j.
Milk sugar	gr. l.

[One measure.]

3. Stopper the mouth of each bottle with dry baked cotton, and sterilize for twenty minutes.
4. Set aside to cool.
5. Add lime-water, dr. ij. to each bottle before use.
6. Apply a plain rubber nipple to the bottle.
7. Warm to blood-heat in warming-cup.

Sterilization is accomplished by exposure to steam heat in a closed vessel. The Arnold's steam cooker is the best apparatus for the purpose. Clinical experience has shown that milk sterilized by steam loses its nutritive qualities, so that a certain proportion of infants will not thrive upon it. This difficulty can be obviated to some extent by the predigestion of the milk before sterilization, as in the following formula :—

1. Have ten nursing-bottles prepared clean every morning.
2. Take

Cream	5 ozs.
Milk	2½ ozs.

3. Put in skillet ; add pancreatin powder ; heat over alcohol flame for six minutes ; stir and sip constantly ; *do not overheat*.
4. Of this mixture, put in each bottle 6 drs. (to make 2-oz. bottle). Use funnel.
5. Add to each bottle 10 drs. sugar solution.
6. Stopper the mouth of each bottle with dry, baked cotton, and sterilize for twenty minutes.

7. Set aside to cool.

8. Before use, put bottle in warming-cup; apply nipple immediately before giving it to infant.

Make sugar solution by dissolving 1 oz. sugar of milk (1 powder) in a pint of warm water.

The pancreatin powder, for the quantity indicated on the card, consists of—

Rx Pancreatin	2½ grs.
Bicarbonate of sodium	5 grs.

The sodium salt furnishes the alkalinity desired, so that lime-water may be dispensed with.

The disadvantages of steam sterilization may be still further obviated by the so-called Pasteurization of the milk mixture. Make up whole quantity by preceding formula and stir in the pancreatin powder, if predigestion is considered desirable. Divide among the bottles to be used in 24 hours. Set these in a receptacle, pour in boiling water till it reaches the level of the milk in the bottles, put on a cover and set aside for 30 minutes to cool. Then put the bottles on ice till they are used. This raises the temperature of the milk to 150°+, which practically sterilizes it without impairing its nutritive value.

CONDENSED MILK.

It is possible to obtain a chemical imitation of human milk which is practically sterile, not impaired in nutritive qualities, and which at the same time is easily prepared as follows:—

Condensed milk	1 part.
Water (boiled)	10 parts.
Cream, 1 drachm to the ounce of the mixture.	

Milk is condensed in vacuo at a comparatively low temperature.

CONDENSED MILK ANALYSIS.

Moisture	24-25
Fat	9.5-10.5
Nitrogenous matter	11.5-12.5
Milk sugar	11-13
Cane sugar	39-40
Ash	2.2

This analysis shows the necessity of diluting in the proportion of 1 to 10 to reduce the casein percentage. When thus diluted it is too poor in fat ; hence the addition of the cream, which, by the following analysis, is seen to contain 13 per cent. or more of fat :—

CREAM ANALYSIS (MEIGS).

Water	79.122
Fat	13.362
Casein	2.919
Sugar	4.140
Ash	0.457

Cleansing.

Daily bath in the middle of the day in the warmest part of the room. Temperature of water 90°+. Castile soap and soft sponge.

Airing.

In summer the baby may be taken out after the second month. In winter after the third month, for a few minutes about noon, although each baby is a law unto itself in this respect.

Resting Place.

Preferably a crib.

Pathology of Newborn Infant.

INJURIES TO INFANT DURING LABOR.

Classified according to seat of injury.

1. Brain.

The injury is most frequently the result of faulty use of forceps or extraction of after-coming head. It may be (a) a *meningeal hemorrhage*, varying in extent from rupture of a small vessel to longitudinal sinus. If lesser in degree, the child may live to adult age, but is apt to have paralysis or mental impair-

ment. (b) *The brain substance may be crushed.* (c) *Injuries not so grave, but affecting intellectual or physical centres, and the subsequent mental or physical development of the individual.* (d) *Compression—causing asphyxia.*

2. Peripheral Nerves.

Facial and brachial plexuses most frequently damaged. The majority of cases of facial hemiplegia due to faulty use of forceps. Recovery usually in the course of a week. Should this fail to occur, the faradic current may be used with advantage. The brachial palsies result from unskilled attempts at extracting the shoulders, and are more likely to be permanent.

3. Skull.

(a) *Spoon-shaped Depressions of Parietal Bone.*—A prominent promontory or forceps may cause them.

(b) *Fractures.*—Require an antiseptic dressing. Recovery sometimes occurs.

(c) *Distortion.*—Very common. Result of different presentations and positions. Disappears within the first three days.

4. Scalp.

(a) *Caput Succedaneum.*—A serous infiltration of that portion of the presenting part corresponding to external os. Disappears in three days and requires no treatment.

(b) *Cephalo-hæmatoma.*—A more dangerous condition, and to be distinguished from the above. Occurs about once in two hundred cases. Two or three days *after* birth, usually, a swelling develops, rapidly increasing in size, with signs of a cystic tumor, distinctly confined to boundary of one of the cranial bones. It may be bilateral, may occupy the parietal and occipital bones, and may occur before birth. It is due to a subpericranial hemorrhage, giving rise to a bony sensation at the lifted edges of the pericranium and later a peculiar crackling or crepitus. Non-interference is the treatment, except when the hemorrhage is excessive or suppuration occurs. The former may be controlled by pressure and cold; the latter requires incision and drainage under strict antisepsis.

(c) *Contused and lacerated wounds.*

(d) *Sloughs*.—The vitality of the scalp may be destroyed by forceps or prolonged pressure, and sloughs appear in a few days. Require ordinary surgical treatment.

5. Face.

Caput succedaneum may form. *Eyes and mouth* may be injured by careless examinations or extraction of after-coming head. The former may be injured by the forceps. The globes may be luxated to complete exophthalmos: the recti muscles may be permanently paralyzed; there may be subconjunctival or palpebral ecchymoses, œdema of the lids and temporary ptosis; fracture in the roof of the orbit; exudation of blood into the anterior chamber.

6. Neck.

(a) *Injury and thrombus of muscles*, with reactive inflammation, most frequently of sterno-cleido-mastoid, with the development of torticollis. Usually recovers without treatment.

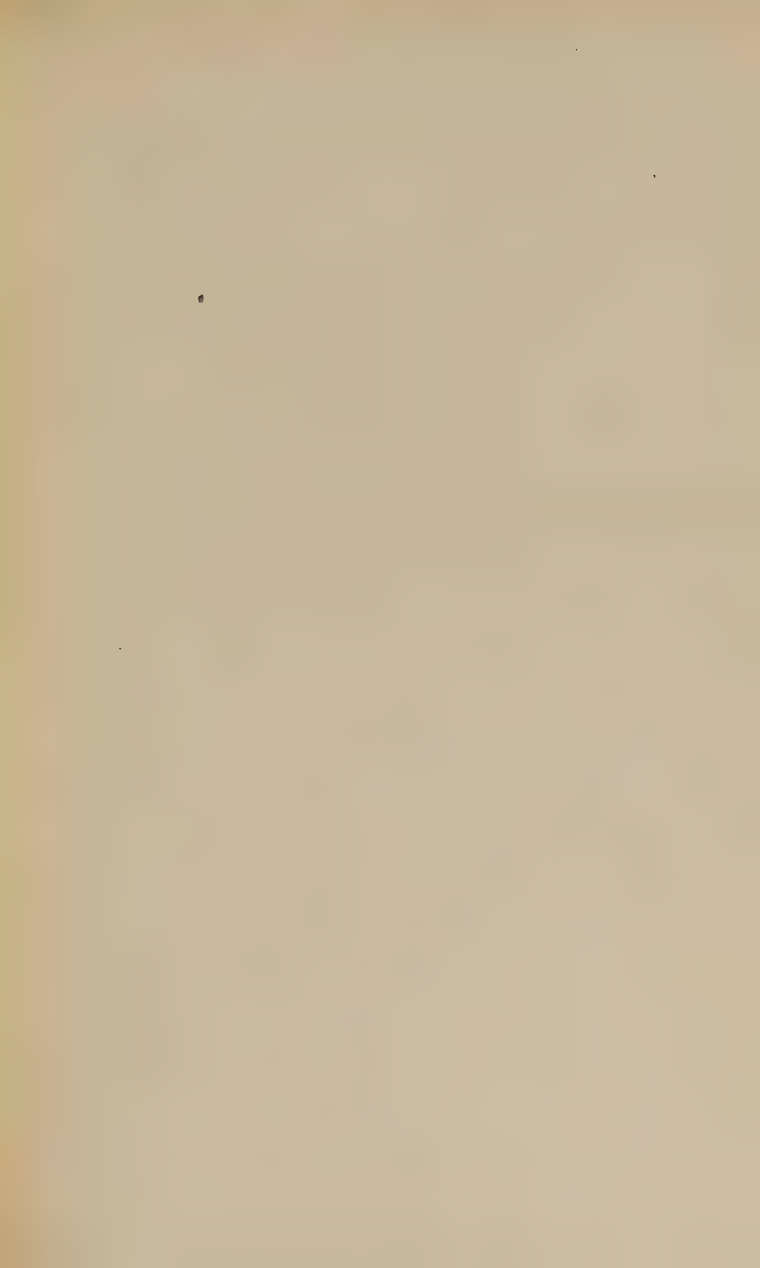
(b) *Fracture, dislocation or decapitation*.

7. Limbs.

Fractures, which are usually a separation of diaphysis and epiphysis, requiring surgical fixation and extension. Union is prompt. They are usually the result of faulty management on the physician's part, but may be spontaneous. Avulsion of the limbs sometimes occurs in efforts to extract a premature or macerated foetus.

8. Trunk.

Perforations of the groin and perineum may occur, as result of use of blunt hook or forceps applied to breech. There may be rupture of some important viscus, like the spleen or liver, with fatal hemorrhage into the peritoneal cavity, especially in syphilitic children. Or visceral hemorrhage may occur without actual rupture, but to a sufficient degree to abrogate the functions of the organ. Fracture of the clavicle in extracting the after-coming head may result in the puncture of the lung by the broken end of the bone and fatal emphysema. The kidney, spleen, and liver have been ruptured in attempts to



extract the breech. Subcapsular hemorrhages in these organs are observed quite frequently. In the pleura there are often ecchymotic spots in asphyxiated children, with minute but multiple extravasations in lungs and brain.

9. Bowel.

The large bowel may rupture, from pre-existing ulceration, usually at the sigmoid.

ASPHYXIA.

Asphyxia of the newborn child results in consequence of an insufficient supply of oxygen.

Physiology of the Institution of Respiration.—The sudden change in its environment (liquid 99° to air 70°) produces an exaggerated stimulation of all muscles to reflex action. Placental respiration is abolished, and the accumulated CO₂ primarily stimulates, finally paralyzes the respiratory centre.

Causes:—

(*α*) *Intrauterine.*

1. Fœtal inspiration.
2. Any interference with placental respiration paralyzing the brain centres, as premature detachment of placenta; coiling, compression or prolapse of the cord; diminution of the calibre of the umbilical vessels, as from syphilitic periphlebitis; excessive and prolonged uterine contraction.
3. Prolonged pressure on fœtal brain by pelvis or forceps, paralyzing brain centres.
4. Grave systemic diseases of the mother, including hemorrhage, uterine or pulmonary.
5. Immature development of the infant.
6. Anomalies or diseases of the fœtus preventing the entrance of air into the respiratory tract, or preventing the proper distribution of blood from right ventricle to lungs, as a patulous foramen ovale or atresia of the pulmonary artery.

(*b*) *Extrauterine.*

1. Placing the infant after birth in a position unfavorable for respiration.

2. Precipitate labor. Probably by producing premature separation of a portion of the placenta.

3. Interference with the access of air to respiratory passages, as by a caul, unruptured membranes, or maternal discharges.

Varieties:—

(a) *Livida*. Accumulation of CO_2 is excessive, yet circulation and reflexes are preserved. Prognosis favorable.

(b) *Pallida*. Usually an advanced stage of the former, characterized by weakness of the heart and slowing of its pulsations to a marked degree and abolition of reflexes. Prognosis unfavorable.

Treatment.—If possible, should be prevented by removing the cause.

1. Extraction of mucus from throat and fauces by holding the child by the feet and cleaning the mouth with finger.

2. Application of an exaggerated stimulus, as slapping, rubbing, immersing in warm water, and pouring ice-water on epigastrium; electricity, if at hand preferably faradic, one pole being placed on epigastrium and the brush applied down the sternum, flanks, and thighs. In the pallid variety only the most powerful of these are useful.

3. Artificial respiration.

(a) Sylvester's method. (Not recommended.)

(b) Marshall Hall's modified to suit the requirements of the newborn infant by suspending in a towel, and thus rolling it from side to side.

(c) Schultze's. (Probably the best.) The infant should be wrapped in a towel to protect it from being chilled, and after practising the swinging movements fifteen to twenty times, it should be immersed in warm water to bring up the temperature when the movements may be repeated.

(d) Mouth-to-mouth insufflation. Secure exit of air by holding the infant with the head extended, and after inflating the lungs flex the head and compress the chest. Do not hold the nose to prevent the escape of air, as sometimes advised. The air-vesicles are not so likely to be damaged.

(e) Catheterization of larynx with soft catheter.

(f) As a last resort tracheotomy and catheterization through the wound. Only required in most exceptional cases.

Risks Attending Artificial Respiration.—Injuries, as apoplexies; Schultze's method may injure the spine; hemorrhagic effusions in the pleuræ and lungs; rupture of the air-vesicles in insufflation; trachea and larynx may be injured. Lung may be punctured if the clavicle is broken.

DISEASES OF THE NEWBORN INFANT

I. Diseases of the Lungs.

1. Atelectasis.
2. Syphilis of the Lung.
3. Septic Infection.
4. Tuberculosis.
5. Pneumonia.
6. Pulmonary Apoplexy.

1. *Atelectasis.*

Cause.—Not known. Sometimes obstruction to entrance of air, as by an enlarged thymus, clot of blood, curd of milk, etc.

Diagnosis.—Usually not made. Dullness on percussion usually on *one* side. Respiration slightly accelerated and imperfect. Absence of fever. These signs present at birth.

Pathological Anatomy.—One lung is found shriveled up, is not crepitant, and sinks when placed in water.

Prognosis.—Not necessarily grave.

Treatment.—If the diagnosis is made, gentle sufflation of lung with catheter might be made.

2. *Syphilis of the Lung.*—The diagnosis can be made by a history of syphilis in the parents, by the signs of fetal syphilis together with the cyanosis and physical signs of pneumonia. The temperature is very low, necessitating the use of an incubator. Treatment is of no avail, the child usually dying within 24–36 hours.

Pathological Anatomy.—An enormous overgrowth of connective tissue is found, compressing the bloodvessels and diminish-

ing the capacity of the air-vesicles. As some air has entered the lung, a cut-off portion never sinks, but does not float buoyantly. The "white pneumonia" of syphilitic infants is rare. It is the result of proliferation, desquamation, and fatty degeneration of the epithelial cells in the lungs, giving the latter a white appearance, and distending them so that the thoracic cavity is well filled out and the lungs bear the imprint of the ribs. Respiration is impossible.

3. *Septic Infection*.—Rare since the introduction of antiseptics. Results from the inspiration of septic matter.

4. *Tuberculosis*.—Caused by mouth to mouth respiration by a tuberculous person. Very rare.

5. *Pneumonia*.—Is caused by the inspiration of maternal discharges, resulting from intrauterine respiratory efforts when asphyxia is threatened.

Pneumonia arising from this cause develops twenty-four hours after birth, in a child apparently healthy, temperature at this time beginning to rise and respirations growing more rapid. Cough, although a variable symptom, is often incessant. The child is restless, refuses nipple, is cyanotic, at times gasps for breath, and there may be dullness over one or both lungs. The diagnosis cannot always be made by the physical signs; only a small patch may be involved. There is usually a history of dystocia. When a newborn infant has a high temperature, septic infection or pneumonia should be suspected, and when in doubt treat as for the latter.

Prognosis.—Grave. Recovery or death in a few days.

Treatment.— $\frac{1}{2}$ to 1 gr. carbonate of ammonium in 3ss–3j mucilage of acacia every four hours. Tinct. digitalis, drop doses every two or four hours. Mustard bath once, twice, or thrice daily.* Cotton jacket. Mother's milk, from medicine dropper, every hour, and with this a few drops of brandy every two or three hours.

Pathological Anatomy.—Shows the features of catarrhal pneu-

* The bath is made as follows: Three large pitchersful of water 100° F., and a tablespoonful of mustard; allow the child to remain in the bath for five minutes, or until the temperature of the latter falls to 95°, when the infant should be removed to a warmed blanket.

monia. A cut-off portion always sinks (thus distinguished from syphilis of the lung).

6. *Pulmonary Apoplexy*.—This is a rare accident in young infants, the result of severe straining in crying or coughing. There is hæmoptysis, the quantity of blood usually not very great.

II. Syphilis of Newborn Infant.

Symptoms.—The child is often ill-developed and ill-nurtured, but the characteristic signs do not usually develop before four to six weeks. In order of frequency these signs are—

Coryza syphilitica. The discharges are very irritating to the upper lip, and frequently produce crusts and even ulceration.

Maculo-papular syphilide.

Roseola. Especially marked on the heels.

Cutaneous papules and mucous tubercles.

Rhagades oris et ani.

Pemphigus.

Cutaneous ulcers.

Paronychiæ.

Pseudo-paralyses of extremities. Due to infirm connection between diaphysis and epiphysis or to painful periostitis, which inhibits motion.

Hemorrhagic diathesis.

Bone diseases.

Fever.

Disease of testicles. Enlarged from overgrowth of connective tissue.

Treatment.—Best results from internal use of calomel with chalk or soda, $\frac{1}{2}$ grain given twice a day, gradually increasing the dose. Should vomiting or diarrhœa occur, resort to inunction, rubbing a piece of mercurial ointment as large as end of finger on binder every other day. Always carefully watch for poisoning.

This treatment should be kept up for months, replacing it from time to time by tonics or drop doses of the syrup ferri iodidi.

Prognosis.—If the child is well nourished by its mother or wet

nurse, the prognosis is very good, so long as some important internal organ is not seriously affected. In artificially fed children it is very bad. The wet nurse is liable to be infected, and she should not be ignorant of her danger.

III. Mastitis.

Four days after birth the breasts in both sexes contain colostrum, which has disappeared by the twentieth day. During this period there may occur in the breast of the child pathological processes like those in the breast of the puerpera. They can enlarge, become painful, the skin angry red, secretion much increased, and even mammary abscess develop.

Treatment.—Avoid squeezing. Apply cooling lotions, as lead-water and laudanum, and oil the skin to relieve tension. If suppuration supervene, poultice and open early.

IV. Specific or Essential Fevers.

(a) Exanthemata. The infant may exhibit the exanthema at birth or take the disease subsequently. Treatment is the same as under other circumstances.

(b) Erysipelas.

(c) Malaria.

(d) Septicæmia. Infection occurs through umbilicus. The most important treatment is prevention (see Diseases of Umbilicus); usually occurs in the first two weeks of life; may develop as late as the fourth.

V. Treatment of Certain Congenital Deformities.

Hare-lip.—The deformity prevents suckling; hence immediate plastic operation in the first few hours of life.

Cleft-palate.—Too serious an operation to be undertaken at this time.

Supernumerary Digits.—Contain rudimentary bone. Ligature and snip off.

Tongue-tie.—Snip superficially with scissors and tear with fingers.

Umbilical Hernia.—There are two varieties: (a) A knuckle of intestine covered by skin, occurring in two per cent. of babies,

and treated by a convex button, cork, or hard rubber compress on a strip of adhesive plaster. (b) An exomphalic condition due to defective development, the intestines covered by amnion. If the exomphalic condition be even the size of an apple, an immediate plastic operation is indicated.

Spina Bifida.—To be distinguished from the less serious conditions—fibroma, myxoma, or lipoma of buttocks, and from parasitic growth by inclusion. In spina bifida a hardened patch is found at the prominence of the tumor due to the attachment at that point of the cauda equina.

Treatment.—Lay the tumor open, dissect out the sac, make traction upon the latter, when the cauda equina will retreat into the canal; ligate with cat-gut the pedicle formed and accurately close up the wound with buried cat-gut sutures under strict antisepsis.

Imperforate Rectum.—Examine the anus and rectum immediately after birth in all cases. To avoid the danger of fecal accumulation inguinal or lumbar colotomy should be performed. In simple cases a cruciform incision over the imperforate anus is sufficient to open the rectum. The mucous membrane is then stitched to the skin.

VI. Nasal Catarrh.

Causes.—When not syphilitic, usually faulty clothing, ventilation or temperature of the room.

VII. Diseases of the Mouth.

(a) *Aphthæ.*—Rounded, pearl-colored vesicles seen in mouth and on lips. Washing the mouth daily with a clean linen will prevent them. Boric acid, gr. v-x to the ounce, is curative.

(b) *Thrush.*—Coalescence of white spots, with an areola of reddened mucous membrane. Is often seen in hospital practice. Now thought to be due to the presence of a parasite, the *saccharomyces albicans*.

Treatment.—Boric acid, gr. xvj to xx to ʒj of honey. ʒss of this three or four times a day. The associated symptoms of malnutrition, diarrhœa and vomiting indicate attention to hygienic surroundings and the general health of the child,

(c) *Gonorrhœal Stomatitis*.—A violent inflammation of oral mucous membrane due to gonococcus. Cleanliness and mild disinfection of the mouth will effect a cure.

(d) *Sublingual Cysts*.—Probably from occlusion of duct of a submaxillary gland. Appears in the first few days after birth, and may reach such a size as to displace the tongue and to interfere with sucking. Treatment—puncture.

VIII. Colic. Diarrhœa. Constipation.

(a) *Colic*.—Attention to diet. One grain of pepsin may be given in 3j of hot water, and a few drops of brandy or gin. Milk of assafetida gtt. xx–xl, or soda mint 3j, may be used, and a spice plaster applied to the abdomen.

(b) *Diarrhœa*.—Attention to diet. Frequent movements may be checked with the following :—

℞ Acid sulphuric aromat.
Tinct. opii camph., āā gtt. iv.

(c) *Constipation*.—In acute cases a dose of castor oil (3j), the soap stick, a glycerine suppository or injection (gtt. xv–xx in 3j of water), or the following may be used :—

℞ Calcined magnesia,
Sugar of milk, āā gr. viiss.

For chronic constipation the daily injection of warm soap suds (fʒij) through a funnel and catheter or soft-bulb rubber ear syringe, are least harmful.

IX. Skin Diseases.

(a) *Gum*, due to the irritation of atmosphere and clothing. Is a papular eruption resembling acne, but never becoming pustular.

Treatment.—Cleanliness, cosmoline, and proper clothing.

(b) *Simple Acute Pemphigus*.—Rare. From the second day to the fourth, fifth or sixth week, vesicles the size of a pea to a quarter- or half-dollar appear indifferently over the whole body except soles and palms, and last from twelve to fourteen days, without manifestation of constitutional disturbance.

Is contagious ; may be carried by nurse, and may be commu-

nicated to mother or nurse. It disappears without treatment. The specific microbe, it is claimed, has been discovered.

(c) *Syphilitic Pemphigus*.—Usually occurs *in utero*, and the child is born with vesicles, the soles and palms most often affected. The disease is associated with marked evidences of malnutrition and constitutional disturbance, and yields only to specific treatment.

X. Ophthalmia Neonatorum.

Symptoms.—Usually after twenty-four to forty-eight hours the eyes are œdematous and puffed out, and there appears a seropurulent discharge, which is soon greenish pus. If the lids can be separated, the conjunctivæ are red and velvet-like in appearance, and later the cornea may lose its epithelium, ulcerate, and be perforated.

Treatment.—(a) *Prophylactic*. Credé method. As soon as head is born warm water is dropped in the eyes. When the delivery is completed the eyes are again cleansed with warm water, followed by one or two drops of a ten-grain solution of nitrate of silver. A vaginal douche of bichloride is not always effective, because the cervix is not reached. There is danger of poisoning or sending air into the uterine veins if the cervix be injected.

(b) *Curative*.—The eyes are cleansed every hour, alternating with a concentrated solution of boric acid and bichloride of mercury, 1 to 5000 or 8000. Morning and evening, nitrate of silver, 20 grains to the ounce, is dropped in the eye. If only one eye be affected, bandage the other carefully with a pledget of lint to protect it. The mouth, the nose, and the ears of a new-born infant may be the seat of inflammation from gonorrhœal infection.

XI. Hemophilia.

A disposition to bleed, which is inherited. The manner of transmission is peculiar; always through mother to male children, who do not transmit it. The female children show no evidences of it, but do transmit it. The cause is not known, and it manifests itself all through life. Treatment is of no avail. It

should be remembered that a hemorrhagic diathesis is sometimes due to syphilis, and in such cases specific treatment is of value.

XII. Icterus.

Two classes of cases :—

(a) Jaundice very light in degree. Face and breast only affected. Very common.

Cause.—Hepatogenic. The very small common biliary duct fails to empty into the bowel the excess of bile produced by the liver. (See page 47.) Disappears third or fourth day after birth, and usually requires no treatment. Fractional doses of calomel may be given.

(b) Whole body is jaundiced. Urine and feces discolored and may contain blood. Is rare.

Cause.—Hepatogenic. Is also seen in Buhl's and Winckel's diseases, in septic infection, producing disintegration of the blood, in atresia of the bile duct, and polycystic disease.

Prognosis of malignant variety.—If from Buhl's or Winckel's diseases, or from septic infection, as is commonly the case, is usually fatal.

XIII. Cyanosis.

Causes, in order of frequency : Pneumonia (often syphilitic), premature birth, asphyxia, atelectasis, degeneration of the blood, malformation of heart and bloodvessels, interference with nerves of respiration, malformations of respiratory tract, congenital pleurisy, partial occlusion of trachea.

XIV. Congenital Heart Affections.

From intra-uterine endocarditis, as stenosis of right and left auriculo-ventricular orifices, stenosis of aortic and pulmonary orifices.

From defective development, as patency of foramen ovale, atresia of the pulmonary artery, stenosis of the conus arteriosus, defects in the ventricular septum.

XV. Diseases of Umbilicus.

(a) *Septic Infection*.—The ulcer is covered with a grayish diphtheritic membrane, has a reddened areola, and may lead to general infection. An acute, high fever in a new-born infant suggests septic infection or pneumonia. The latter may be septic.

Treatment—Prophylactic.—The ulcer should be exposed at the daily bath, cleaned with soap and water, and dressed with salicylic acid, 1 part; starch, 5 parts. Tape, soaked in an ethereal solution of iodoform or antiseptic Chinese silk, should be used to ligate the cord at birth. *Curative*.—The ulcer to be touched with solution of bichloride (1 to 500), and dressed as above.

(b) *Umbilical Fungus*.—An overgrowth of granulations. Cauterize with nitrate of silver. In about one-fifth of these cases nitrate of silver fails, the tumor is more solid, and is the remains of the omphalic duct called an enteroteratoma. It should be ligated and cut off. The cord may persist unchanged or a spur of well-organized connective tissue may project from the umbilicus.

(c) *Omphalitis*.—A peculiar inflammation of the umbilicus, in which the abdomen is conical, skin and subcutaneous connective tissue hard, red, and infiltrated. It is always septic in origin, requires disinfection, poultices, and early incisions, with stimulants and nourishment. A later stage is gangrene. Prognosis is serious.

(d) *Disease of Vessels*.—Always due to septic infection, and invariably ends in general septicæmia, which is fatal.

(e) *Hemorrhage* (Omphalorrhagia).—From the cord or umbilical ulcer. It may be primary from careless ligation of the cord; or secondary, after the cord drops off (the vessels of the cord close from placental end, and the hypogastric arteries may be patulous after the cord drops off, when increased blood pressure or handling the ulcer may bring on hemorrhage). Mortality, 76-83 per cent.

Treatment.—Re-ligate the cord. In bleeding from the umbilical stump, if bleeding vessel seen, ligate. Usually requires

Monsel solution and pressure, liquid plaster of Paris, or successive layers of bismuth with gauze and collodion. As a last resort, transfix with hare-lip pins or ordinary large size needles, and apply figure-of-eight ligature. If there is enough stump of the cord, draw it out and transfix with two pins or needles and ligate below them; if this is impossible, the pin should transfix the abdominal wall just below the umbilicus, so as to occlude the hypogastric arteries. Should the hemorrhage continue, it can be controlled by a pin above the umbilicus to occlude the umbilical vein.

XVI. Tetanus.

Is infectious, the poison entering through umbilicus. Occurs almost exclusively in hospitals, and is usually fatal. The treatment should always include a thorough disinfection of the navel.

XVII. Melæna.

An extravasation of blood into stomach and intestines, occurring most often in the first few hours of life. Duodenal ulcer, some congenital defect increasing intra-abdominal blood pressure, or hemophilia may be the cause. To be distinguished from vomiting of blood due to a fissured nipple.

Treatment.—Gallic acid, gr. ij every hour. Ergot hypodermatically, ice-bag to stomach, hot bottles to thighs. Mortality 50 per cent.

XVIII. Perforation of Intestines and Intussusception.

The former are situated at the flexures of the large bowel (sigmoid, splenic, hepatic), due to pressure necrosis resulting from accumulation of meconium. Post-mortem intussusception should be borne in mind as more common than in the adult.

XIX. Buhl's Disease.

Parenchymatous inflammation with acute fatty degeneration of all organs.

Symptoms.—Icterus, cyanosis, diarrhœa, vomiting, etc., are

present, but nothing sufficiently characteristic to make a diagnosis before death.

XX. Winckel's Disease.

Acute hæmoglobinuria with jaundice, cyanosis, and fatty degeneration of all organs caused by a micro-organism.

These two diseases are probably rare and peculiar manifestations of septic infection perhaps due to the reception of a large dose of poison directly into the blood through the umbilical vein.

XXI. Œdema Neonatorum.

This affection is always due to kidney insufficiency and is invariably fatal.

XXII. Bloody Discharge from Genitalia of Female Children.

Not very rare. Perhaps analogous to breast changes in the newborn. The condition is not dangerous and requires no treatment. The blood comes from the uterus, like the menstrual discharges. Appears three or four days after birth and lasts only a few days.

XXIII. Sudden Death of Apparently Well Children.

Causes.—(a) Overlying by mothers, accidentally or intentionally.

(b) Diseases: most commonly pneumonias, apoplexies, more rarely perforation, intussusception, rupture of large viscus, or other diseases, as above.

(c) Occlusion of trachea by enlarged thymus or by curds of milk.

Medication.

The following are some of the drugs and their doses required in the first four weeks of life. Opium, as paregoric 2-5 gtt., laudanum $\frac{1}{4}$ - $\frac{1}{2}$ gtt., mercury, as calomel $\frac{1}{12}$ - $\frac{1}{8}$ gr., castor oil 15 gtt. to 3j, nitrate of silver $\frac{1}{40}$ grain, pepsin gr. j-ij, gallic acid gr. ss.-ij., etc

Pathology of the Puerperal State.

I. Abnormalities of Involution.

These may be anomalies by (*A*) excess, *superinvolution*, (*B*) by defect, *subinvolution*.

Involution.—The old theory was that by fatty degeneration and absorption the uterus was regenerated from the embryonal muscle cells in the outer layer. This has been disproved. The degeneration is chiefly fatty, but there are other degenerative processes at the same time. Regeneration is not absolute, *i. e.*, the whole muscle cell is not destroyed, but loses its redundant tissue. The process is rather an atrophy, and stops after the muscle fibre reaches its original size. This same process affects the mucous membrane, peritoneum, uterine annexa, vagina and vulvæ. Below the contraction ring it is an intermediate process, mainly retraction of overstretched tissue.

(*A*) *Superinvolution*.—An exaggeration or abnormal prolongation of that process by which the parturient uterus regains its normal conditions. Is rare. Its diagnosis and treatment belong to Gynæcology.

(*B*) *Subinvolution*.—A retarded or arrested involution.

Causes.—(*a*) Anything *increasing blood supply*, as hypertrophy of mucous membrane during pregnancy, fibroids, inflammatory conditions resulting from sepsis, mechanical interference with pelvic circulation, leading to its engorgement, as heart disease, premature getting up, premature resumption of sexual intercourse.

(*b*) Anything *interfering with contraction of uterine muscle*, as retained placenta, polypoid tumors, large masses of decidual tissue, uterine displacements, distended bladder or rectum, dragging adhesions. The cause is always a local one, *i. e.*, typhoid, pneumonia or other diseases occurring during the puerperium have no influence in retarding involution.

Diagnosis.—Abdominal palpation in the early stages discloses abnormalities in the daily diminution in size of the uterus. Later there is a history of the continuance of the bloody lochia.

1st day, normally, the fundus one finger above umbilicus.

2d day, the fundus level with navel.

3d and 4th day, the fundus a trifle below navel.

5th and 6th day, the fundus two fingers below navel.

7th, 8th, and 9th day, the fundus three to four fingers above symphysis.

10th, 11th, and 12th day, the fundus a little above, at, or below symphysis.

Involution is not complete for six weeks, and to determine the size of the uterus subsequent to its retraction below the symphysis (12th day), the following intrauterine measurements have been made :—

10th day . . .	$10\frac{1}{2}$ cm.	5th week . . .	$7\frac{1}{2}$ cm.
15th " . . .	9.9 "	6th " . . .	$7\frac{1}{16}$ "
3d week . . .	8.8 "	8th " . . .	$6\frac{7}{16}$ "
4th " . . .	8 "	10th and 12th week	$6\frac{1}{2}$ "

7 cm. is the normal measurement of the non-pregnant uterus, and this table shows, therefore, a physiological super-involution which is overcome by subsequent engorgement of uterine vessels. An examination should always be made on the fourteenth day, when the patient is about to get up. Return of the bloody lochia for a day or two is common, but prolonged beyond this time it indicates subinvolution associated very likely with a displacement.

Treatment.—Varies with the cause. If due to hypertrophied deciduæ, polypoids, retention of placenta or placenta succenturiatæ—curette, placental forceps and fingers. Never allow bladder to be distended nor constipation to exist. Correct displacements, combat septic inflammation, treat any heart disease, and if fibroids or general lack of tonicity be the cause, give a pill of ergotin (gr. j), strychnia (gr. $\frac{1}{16}$), and quinia (gr. ij), and administer faradism daily. The routine administration of ergot not recommended. It does not secure contraction, and often has an ill effect upon the child through the mother's milk.

II. Acute Tympanites.

Relieved by injections of assafoetida; turpentine by the mouth; pressure by firm binder from trochanter to ribs; rectal

bougie. The large intestine may be punctured as a last resort. Sometimes there is complete paralysis of the coats of the bowels and enormous distension, with persistent vomiting and obstinate constipation, the symptoms resembling those of intestinal obstruction. Large doses of strychnia, hypodermatically, are indicated; puncture of the bowel or abdominal section, and evacuation of the intestines at several points.

III. Puerperal Anemia.

A subinvolution of the blood. The physiological hydræmia of pregnancy fails to disappear.

Causes.—Any wasting or depressing disease, loss of blood from post-partum or other hemorrhages, cancer, puerperal chorea, or insanity.

Prognosis.—Yields usually to timely treatment. May progress to pernicious anemia if neglected.

Treatment.—Iron (Blaud's pill). Arsenic seems to be needed in some cases.

IV. Repair of Injuries after Labor.

Slight lacerations and tears heal rapidly. Even extensive injuries, as fistulæ, sometimes heal spontaneously. Small sloughs should be touched with nitric acid to promote granulations which may close the opening. If this fails, a fistula between the vagina or uterus and bladder, rectum, sigmoid flexure, or higher bowel remains to be dealt with by a secondary operation. Laceration of the cervix, if productive of serious hemorrhage, should be closed by suture. Always stitch a laceration of the perineum when beyond a half-inch in length, being careful to apply sutures, so that fistulæ may not result. When the perineum has been torn, a douche is given after delivery of the placenta, and absorbent cotton soaked in 4 per cent. solution of cocaine, although not necessary, may be placed in the vagina, while the doctor prepares his instruments to repair the injury. If the sphincter has been torn, the two edges are united by interrupted sutures. Vaginal tears are often situated in the line of one or the other sulci, usually sparing the posterior column, and

are best united with a curved needle and three sutures of silk-worm gut. The first stitch is passed in a manner somewhat similar to the crown suture in Emmet's operation. It is introduced laterally on a level with the lowest myrtiform caruncle, buried under the tissues and emerges, crossing high up the laceration in the lateral sulcus where it is visible. It then disappears under the posterior column of the vagina, reappears traversing the tear in the other lateral sulcus, is again buried and merges at the vaginal orifice directly opposite the original point of entrance. The other two sutures unite superficially the edges of the torn perineum which the first suture has approximated.

If there has been extensive abrasion of the mucous membrane in consequence of the passage of the head, or extensive ulceration in the puerperium, the raw surfaces may unite, thus producing partial or complete atresia of the lower genital tract.

Any of these injuries will produce an immediate elevation of temperature after labor above the normal rise.

V. Puerperal Hemorrhages.

Hemorrhages occurring during the puerperium, from 24 hours after labor until the completion of involution (6 weeks). Hemorrhage is called post-partum when it occurs within the first 24 hours after labor.

Causes, in Order of Frequency:—

- (a) Retained Secundines.
- (b) Displaced Uterus.
- (c) Displaced Thrombi.
- (d) Emotion.
- (e) Relaxation of Uterus.
- (f) Retained Clots.
- (g) Fibroids.
- (h) Hæmatomata.
- (i) Pelvic Engorgement.
- (j) Secondary Bleeding.
- (k) Carcinomata.
- (l) Placental and decidual polyps. Hypertrophied and adherent masses of decidua.

Retained Secundines.—Always examine placenta to see if a part has been retained, and remove antiseptically with the finger any fragments left in the uterus. If more than one-third of the membranes are retained, they should be similarly removed.

Displaced Uterus.—When lateral, anterior or posterior, hemorrhage is due to the congestion or retention of blood from mechanical obstruction. In the latter clots will be discharged. This congestion, with loss of tonicity, often develops subinvolution. Backward displacement is frequently caused by a (1) sudden effort, especially if patient is out of bed too early, (2) misplaced compress, (3) over-distended bladder. Inversion and prolapse considered later. In all cases the bladder should be emptied and uterus replaced.

Displaced Thrombi.—Perfect quiet should be secured to prevent dislodgment of the thrombi formed in the uterine sinuses. The most dangerous is when they are disintegrated by microbes with the development of septicæmia.

Treatment.—As hemorrhage from this cause is usually sudden and alarming, at once apply an intra-uterine tampon of iodoform gauze.

Emotion.—How it produces hemorrhage is not known. Probably by interference with blood pressure or causing relaxation of the uterus.

Relaxation of Uterus.—Rarely occurs. Almost never after the third day, and even before this time only in women of poor physique.

Treatment.—Same as for post-partum hemorrhage.

Retained Clots.—Rarely a primary cause, but often secondary to retained placenta, flexions, etc.

Fibroids.—Always cause excessive lochia and usually produce hemorrhage.

Treatment.—A pill of strychnia, ergot, and quinine. Faradic current. If severe, an intrauterine tampon.

Hæmatoma.—Is an interstitial bleeding, submucous, subcutaneous or subperitoneal. The resulting tumor, which is usually globular in shape, may be situated on one or both labiæ, in the cervix or broad ligament, etc. The very small ones are more frequent.

Causes.—(a) Predisposing.—Pelvic engorgement and straining during labor. Marked anteversion.

(b) Exciting.—Rupture of a bloodvessel, usually a vein of large size, from straining, a blow or forceps.

Symptoms.—The rupture occurs during the second stage of labor, accompanied by sharp, lancinating pain and painful expulsive efforts, the tumor usually appearing after labor is completed. It has been mistaken for a retained placenta, blood clot, inversion of the uterus.

Prognosis.—Death may occur from hemorrhage or sepsis, but ought to be exceptional.

Treatment.—Secure absorption if not larger than one's fist, by cleanliness, rest, cooling applications, and antiseptic douches. If larger, wait until it ceases to increase in size (except when it appears between the birth of twins or prevents escape of lochia), when it should be incised and turned out. Control hemorrhage when sac ruptures by ligation or iodoform gauze compress. To control the bleeding into the sac when the tumor first appears, resort to cold and pressure with the largest size Barnes' bag. The danger of sepsis contraindicates an ordinary tampon.

Pelvic Engorgement.—May arise from too early sexual intercourse, increased intra-abdominal pressure from liver or heart disease, subinvolution, etc., thus prolonging the bloody lochia.

Secondary Bleeding.—From laceration of vessels along the parturient tract, especially about the meatus, the hemorrhage recurring after the pressure of the child's head is removed.

Carcinomata.—Of the cervix. Rarely may develop suddenly at the placental site and end fatally in a few weeks or months.

VI. Anomalies of the Breasts.

A. Anomalies of secretion.

(a) Defective.

(b) Excessive.

B. Anatomical defects.

C. Diseases.

A. *Anomalies of Secretion.*

(a) Defective secretion.

The secretion may be defective in quantity and quality (see pages 48, 49).

Treatment.—In the great majority of cases artificial feeding is required. Galactagogues are of no apparent value. Electricity, by arousing the glands from a torpid condition, is effective in some cases.

Agalactia, complete absence of milk, is very rare.

(b) Excessive secretion.

1. Polygalactia.—Excessive amount of milk associated with congestion and engorgement of the breasts, with great discomfort to the patient.

Treatment.—Remove the excess of milk at regular intervals by putting infant to the breast, using breast pump (English) or massage.

2. Hyperlactation.—Prolongation of lactation beyond the 9th month. Weaning should begin at the 6th month and be completed at the 9th. *Tabes lactea* is the name given to the exhausted physical condition of the mother, the result of hyperlactation. Anemia, with cramp-like pains of the upper extremities when the child is put to the breast, is a marked symptom of this condition.

Treatment.—The child should be weaned at once, and the mother given tonics, nutritious food, change of air, etc.

(c) Galactorrhœa.—Dribbling or constant flow of the milk after the usual period of lactation, leading to exhaustion of the mother's health and strength. May follow an abortion.

Cause.—None satisfactory. Plethora, anemia, phthisis, paralysis of the muscles encircling the lactiferous ducts have been reported as causes.

Treatment.—Unsatisfactory. The best, perhaps, is pressure, ergot, and potassium iodide. Chloral has been applied with asserted good results. Belladonna locally is not effective. Electricity and local astringents have been recommended. Instituting return of menstruation by faradic current in utero or by warm injections has been resorted to with the result sometimes of increasing rather than diminishing the flow of milk.

B. Anatomical Defects. 1. Congenital absence of or supernumerary glands.

2. Inversion of Nipple.—Rather common in modern girls from pressure of corsets. Should always be looked for.

Treatment.—Instruct patient to pull the nipple out or evert with breast pump, only in last month of pregnancy to avoid miscarriage from reflex contraction of uterus. If the pump fails, resort to a shield, and finally artificial feeding.

(C) *Diseases.*

1. Areola.—The glands of Montgomery may become inflamed and lead to mammary abscess. *Treatment.*—Avoid by cleanliness. Lay open each inflamed gland and touch with strong bichloride solution.

2. Congestion and Engorgement.—Occurs on the third day. *Treatment.*—Avoid by administering saline cathartic. Evacuate the breast at frequent intervals, use hot fomentations, and if the congestion and pain persist apply lead-water and laudanum and a mammary binder.

3. Sore Nipples.—Excoriations and fissures due to maceration and irritation. Mammary abscess frequently results from the entrance of streptococci through these fissures.

Treatment.—(a) *Prophylactic.*—During the latter months of pregnancy the nipple should be washed and greased with sweet oil twice a day, and receive a daily bath with a saturated solution of alum. Glycerole of tannin and water, equal parts, is also good. Avoid alcoholic astringents, and keep the nipple clean during lactation.

(b) *Curative.*—The nipple should be cleansed after each nursing, and one of the following applied: An ointment composed of ʒj each of bismuth subnit. and castor oil; tinct. benzoin comp. applied with a brush; iodoform gr. x to ung. zinci oxidi ʒss, ichthyol, ʒj, lanoline, glycerine, each ʒjss, olive oil, ʒijss; or the fissure touched with ten-grain solution of nitrate of silver. Nipple shield may be necessary, and should be kept immersed while not in use.

4. *Inflammations of the Breasts (Mastitis).*—(a) Of the subcutaneous connective tissue.

(b) Of the deeper interstitial tissue.

(c) Parenchymatous.

There is usually a combination of these varieties.

As in all puerperal infections, the microorganisms may be of many pathogenic varieties. The constitutional symptoms of mammary infection are usually slight, but may be very severe, even though the local inflammation appears to be moderate.

Causes.—Of the first two classes a large proportion are due to sepsis. Parenchymatous inflammation need not be from this cause. Over-activity of the gland with retained secretion (the so-called “caked breast”) may be the cause by weakening the resistance of the cells against microbe invasion.

Treatment.—If parenchymatous and due to over-secretion empty with pump or by massage. If of the connective tissue and abscess is threatened, apply lead-water and laudanum and a mammary binder. Suckling had best be intermitted if inflammation continues and abscess is threatened, as the secretion is apt to disagree with the child, and rarely has given rise to septic infection of the intestines.

Abscess.—The pus may be located :—

- (a) Superficially.
- (b) In the gland substance.
- (c) Post-mammary.

Symptoms of Suppuration.—Uncertain. The reddened skin, fever, bogginess, etc. may be due to other causes, and fluctuation rarely detected until late. Dusky hue of the skin and œdema are, perhaps, the most valuable signs of suppuration.

Treatment.—Be prompt ; err on safe side by making an early incision through the skin, beyond or inside of areola, radiating from the nipple, and then locate pocket or pockets of pus with director. An anæsthetic is desirable. Wash several times a day with antiseptic solution, and apply pressure to prevent further burrowing. If fistulæ result, resort to firm pressure, drainage, and antiseptis. It may be necessary to curette them or lay them open with bistoury.

When the abscess is post-mammary the whole breast is lifted off the chest and there are no signs on the surface.

Treatment.—Incise beyond the periphery of the gland at the

more dependent part, pass a drainage-tube through a counter-opening, and dress antiseptically.

Galactocele.—A milk tumor due to occlusion of one of the lactiferous ducts. Usually of no pathological importance unless it should, as rarely happens, reach a large size, when it may be tapped and drained.

VII. Diseases of the Urinary Apparatus.

1. *Urine*.—During the puerperium there is an exaggeration of the physiological increase which occurs during pregnancy.

2. *Kidneys*.—The most common condition is the kidney of pregnancy. It was found in 39 autopsies 36 times. Inflammatory conditions may be (a) evanescent albuminuria; (b) acute nephritis, which usually develops in the latter part of pregnancy or manifests itself by outbursts of eclampsia; (c) chronic nephritis; (d) abscesses of the kidney or diphtheritic exudate in its pelvis may be found that has spread from the bladder along the ureters; both conditions due to infection of the bladder.

Perinephritic abscesses following labor are due to an infection of the connective tissue in the pelvis and extension of inflammation upward by continuity of tissue, or to an infection from rupture of a kidney abscess into the surrounding cellular and fatty tissue.

3. *Bladder*.—Functional disturbances. (a) Inability to pass urine (see page 138). (b) Incontinence of urine. This may be due to retention; to paresis of sphincter from prolonged labor in head presentation or injury during labor. When due to paresis spontaneous disappearance often occurs. Tonics, astringents, electricity to base of bladder are useful. Fistulæ, as a rule, require stimulating applications (nitric acid, nitrate of silver), besides antiseptic vaginal douches.

Organic affections—(a) Cystitis. Retention of urine and its associated overstretching of the bladder predispose to septic infection by lowering the vitality of the bladder cells and their power of resistance against sepsis. Pressure upon the bladder during labor has the same effect. Dirty catheters are a most frequent cause. The symptoms of cystitis are more malignant

in some puerperal cases. Sloughing and peritonitis sometimes occur, or the spreading of microbes to the pelvis of the kidney leads to pyelo-nephritis. There is usually an interval in the fever between the invasion of the bladder and the kidneys.

Treatment.—Irrigation through a double catheter with one-half of 1 per cent. solution of creolin. A pint may be injected through an ordinary catheter by means of a funnel without fear of overdistention. Should the creolin give much pain, bichloride solution 1 to 8000 may be substituted. In milder cases boric acid solution may be used (gr. xv. to $\bar{3}j$).

Prognosis.—Grave, if the symptoms do not ameliorate in a few (3 to 5) days.

The ureters have been contused during labor, and have become obstructed and inflamed in consequence. They have been torn across. Inversion of the bladder after labor is a possibility.

VIII. Diseases of the Nervous System.

Insanity may occur during pregnancy, labor, or lactation. During pregnancy it is apt to be melancholia; after labor, mania.

Prognosis.—Tolerably good. Two-thirds to three-fourths recover. Death may occur from maniacal exhaustion or septic infection.

Treatment.—Best carried out in an asylum where a rigid regimen is enforced.

Hysteria.—Not uncommon in patients of nervous disposition in the last stages of labor when the head is on the perineum, or during the first few hours after labor.

Acute Tympanites.—For treatment see page 69.

Lesions of Sacral Plexuses; Neuritis and Nerve Degeneration from Pressure during Labor.—Puerperal paralysis may result. Both limbs may suffer (paraplegia), or there may be unilateral paralysis, with atrophy and anæsthesia. The leg or legs may be the seat of constant pain, and may also be very hyperæsthetic. Or there may be intense and persistent pain in the pelvis unassociated with disease of the sexual organs. Pressure with the finger in the rectum upon the sacral plexus causes exquis-

ite suffering. The same results may follow pressure from exudates or involvement in septic inflammations. There may be directly after childbirth, neuritis of nerves distant from the genital region (the ulnar, for instance). Multiple neuritis in alcoholic subjects may develop after childbirth or during pregnancy.

IX. Puerperal Fever.

Puerperal fever is an elevation of temperature during puerperium.

Classification :—

I. INFECTIOUS. II. NON-INFECTIOUS.

The infectious may be further classified as follows:—

A. *Those in which the infecting poison enters through wounds or absorbing surfaces in the genital canal or immediate neighborhood.*

(a) The pathogenic agent a microbe.

(b) The pathogenic agent a ptomaine.

B. *Those in which the poison enters other channels.*

Septicæmia, or wound infection, a name commonly given to the disease resulting from the invasion of the body through solutions of continuity by microbes and their products, may be due to a very great variety and number of microörganisms. In the appended chart will be found a list of some of those discovered up to this time:—

Streptococcus pyogenes.

Streptococcus erysipelatis.

Bacillus œdematis maligni.

Staphylococcus pyogenes aureus.

Micrococcus of osteomyelitis.

Staphylococcus pyogenes albus.

Micrococcus pyogenes tenuis.

Staphylococcus pyogenes citreus.

Staphylococcus cereus albus.

Staphylococcus cereus flavus.

Bacillus saprogenes, 1.

Bacillus saprogenes, 2.

Bacillus saprogenes, 3.

Bacillus pyogenes fetidus.
 Staphylococcus salivarius septicus.
 Coccus salivarius septicus.
 Bacillus salivarius septicus.
 Bacillus of chicken cholera.
 Bacillus of rabbit septicæmia.
 Bacillus of pseudo-œdema.
 Bacillus of mouse septicæmia.
 Mouse-septicæmia-like bacillus.
 Diplococcus pneumoniæ.
 Bacillus resembling pneumonia bacillus.
 Diplococcus intra-cellulosis meningitidis.
 Bacillus septicus agrigenus.
 Streptococcus pyogenes malignus.
 Streptococcus septicus.
 Streptococcus septo-pyæmicus.
 Streptococcus articulorum.
 Bacillus necrophorus.
 Brieger's bacillus.
 Emerick's bacillus.
 Bacterium coli commune.
 Bacillus of intestinal diphtheria.
 Micrococcus botryogenus.
 Micrococcus of progressive lymphomata.
 Bacillus of rhinoscleroma.
 Tetanus bacillus.
 Bacillus of acne contagiosa (Harold Ernst).

I. *Infectious Fevers, the point of infection being in the genital region.*

(A.) The more common variety of infectious puerperal fever is that due to the absorption of ptomaines through wounds in the genital canal. The microbes, which during decomposition generate the absorbed ptomaines, may gain access from doctor, nurse, instruments, or atmosphere charged with putrescible material, and attack clots, portions of hypertrophied mucous membrane, etc. within the uterine cavity. Ptomainé intoxication is followed after a while by microbe invasion, for the products of bacillary activity diminish the vitality and resisting

power of the body-cells, and thus facilitate the entrance of micro-organisms into the system.

There are exceptional cases in which a woman is infected by septic germs that may have had a lodgment in the genital tract before labor, or that may have been contained in a limited area near the parturient tract, as in an old pyosalpinx, whence they spread by rupture of the pus-sac during labor, or are incited to renewed activity by the compression and consequent reduction of vitality of surrounding tissue; or, there may be in the neighborhood of the womb tumors of low vitality and highly putrescible material which, being reduced in resisting power by compression from the descending child, become infected by germs that ordinarily could not influence vigorous body-cells. Dermoid cysts and fibroid tumors are the most frequent examples. It is claimed that even highly vitalized tissues like the pelvic muscles, especially the ilio-psoas, may be so pinched and injured by the child's head that they slough and become gangrenous. These cases were once called auto-infectious, but the infection of course originally comes from without. (In this connection see also p. 122, for an account of the micro-organisms in the vagina.)

Morbid Anatomy of Puerperal Infection.

The lesions may be found in the mucous membrane of the genitalia from the vulva to the abdominal orifices of the tubes; in the mucous membrane of the bowel and of the urinary tract; the parenchyma of the uterus; the pelvic connective tissue; the peritoneum; the lymphatics; the veins; and in the parenchyma of the ovaries. Neighboring organs and tissues can be involved secondarily, as the bowels, ureters, and pelvic nerves. Spiegelberg's classification (modified) is as follows:

1. Inflammation of the genital mucous membrane.—Endocolpitis, endometritis, and salpingitis.

(a) Superficial, suppurative.

(b) Ulcerative (diphtheritic).

(c) Phlegmonous of vulva, vagina, beginning in the submucous connective-tissue layer without previous injury and resulting in loss of substance.

2. Metritis and cellulitis (of subserous and pelvic connective tissue).

(a) Exudation circumscribed.

(b) Phlegmonous, diffused, with lymphangitis and pyæmia (lymphatic form of peritonitis).

3. Inflammation of the peritoneum covering the uterus and its appendages, pelvic peritonitis and diffused peritonitis.

4. Uterine and para-uterine phlebitis, with thrombosis, embolism, and pyæmia.

5. Pure septicæmia or sapræmia—putrid absorption.

To this list should be added—

6. Septic cystitis, ureteritis, pyelitis.

7. Septic proctitis.

1. *Endocolpitis, Endometritis, and Salpingitis*.—Most often of the superficial, suppurative variety, in which the prognosis is good except in the case of the tubes, whence the inflammation may extend to the peritoneum, causing diffuse peritonitis or a circumscribed abscess near the fimbriated extremities, usually involving the ovary, or resulting in pyosalpinx. The diphtheritic variety is less common and much more dangerous; usually localized in the vagina, as ulcers around orifice. Occasionally diffuse, occupying the whole interior of the uterus. The ulcers around the introitus and in the vagina are associated with œdema of the vulva in two-thirds of the cases.

2. *Metritis and Cellulitis (of Subserous and Pelvic Connective Tissue)*.—Septic metritis is a later stage of septic endometritis, usually the diphtheritic variety, but possibly the suppurative. All the structures of the organ are involved—connective tissue, the muscles, lymphatics, and often the veins, especially, however, the first. In the process of the inflammation portions of the uterine muscles may be undermined by ulceration and slough off (dissecting metritis). If the pelvic connective tissue is involved, it is at first œdematous; the liquid is then absorbed, leaving a dense infiltrate if there has been much cell-proliferation, or entirely disappearing if the cell-element is scanty. The infiltrate, if not too extensive, is likewise absorbed (80 per cent. of cases). Occasionally, however (18 per cent. of cases), an abscess results, which may be opened above Poupart's ligament

or through the vaginal vault, without entering the peritoneal cavity, may require an abdominal section, or very likely perforates the rectum, bladder, vagina, or uterus.

In cases of cellulitis from diphtheritic or erysipelatous inflammation the œdema rapidly becomes sero-purulent—in the former case diffuse, in the latter possibly limited.

3. *Pelvic Peritonitis and Diffuse Peritonitis.*—Pelvic peritonitis is the result of the extension from a suppurative or diphtheritic endometritis, either through the tubes or by extension directly through the tissues of the womb, or results from pelvic cellulitis, the germs penetrating the peritoneum between the endothelia or by the lymphatic interspaces. In an extension through the tubes or by the spread of the cellulitis, the ovary is likely to be involved and an ovarian abscess developed.

General Peritonitis after labor may result from an extension of the pelvic peritonitis, which, however, is likely to be limited; from infection through rents in the vaginal or uterine walls; from the rupture of old pus-collections in the tubes or elsewhere in the pelvis; from putrefaction of tumors in the pelvis, as dermoids and fibroids; from the transmission of infecting germs by the lymphatics; and from the extension of septic inflammation through the bladder-walls. Septic peritonitis varies in character: it is usually localized and surrounded by barriers of non-septic inflammatory lymph covering wide areas of peritoneal surface. Encapsulated abscesses very likely result, opening into the bowel, bladder, or through the abdominal walls at the umbilicus; or possibly undergoing caseous changes. If the suppurative peritonitis is not limited, the intestines are lightly glued together, bathed in a thin pus, and covered with a yellowish exudate which can be stripped off.

There is a form of septic peritonitis so virulent and depressing that no signs of inflammation accompany it, and the patient dies before pus or exudate can be formed. The abdomen is found after death filled with a dirty fluid, composed of serum, some blood, and numberless micrococci (peritonitis lymphatica). In all forms of septic peritonitis the coats of the intestines are paralyzed and tympanites is marked.

4. *Uterine and Para-uterine Phlebitis.*—The veins of the uterus

and surrounding connective tissue are prone to thrombosis by sluggish circulation, pressure, and the altered constitution of the blood. The clots may become directly infected, usually at the placental site, disintegrated, and swept into the circulation, producing pyæmia; or the veins may become infected from passing through a septic region. Then the walls are first involved, the blood clots, and perhaps thus opposes the further spread of the process, or more likely the clot is in turn infected, disintegrated, and carried to the large venous trunks. This form of septic infection is least likely to produce peritonitis, most likely to produce pyæmia.

5. *Septicæmia, Sapræmia, or Putrid Absorption.*—The absorption into the system of ptomaines, generated by the putrefaction of hypertrophied decidua, shreds of membranes, blood-clots or pieces of placenta. A common form of septic fever after childbirth. To produce it the germs of putrefaction must gain access to the uterine cavity after labor, which they usually do if there is any pabulum, as above, on which to feed. Occasionally they are excluded, as proved by cases in which a foetal head remained in the uterus three months, a placenta seven months, without doing harm. Of all forms of septic trouble after childbirth, this is the least dangerous and the easiest cured. It may, however, at any time develop into one of the forms previously noted, and should never be neglected.

6. *Septic Cystitis, Ureteritis, and Pyelitis.*—May be of superficial suppurative character or diphtheritic. In the latter case the characteristic exudate or membrane may extend from the bladder up the ureter to the pelvis of the kidney. There may be sloughing of the vesical mucous membrane, putrefaction of the masses exfoliated, and extension of the inflammation through the bladder-walls to the peritoneum. The kidney may bear the brunt of the attack. It may be riddled with small abscesses or converted into a large bag of pus. From contiguity with the liver on the right side hepatic abscesses may also be found.

7. *Septic Proctitis.*—The result of using a badly-infected syringe nozzle. Only likely to occur in hospitals, and rare there. May be of a superficial suppurative or catarrhal, or

of a diphtheritic, character. The latter almost certain to be fatal.

DIAGNOSIS.

The symptoms of septic infection in general are—

(a) *Local*.—1. Putrid discharge. Not invariably present.

2. Diphtheritic patches.

3. Edema of the vulva. The last two are not very frequent, but are found when infection occurs through wounds of the parturient canal.

4. Pelvic peritonitis or true cellulitis, detected by vaginal examination (pelvic exudates; distended, inflamed, adherent tubes and ovaries). Later there may develop physical signs of pelvic abscess.

(b) *General*.—1. Fever, usually preceded by a chill, although a fatal case may very rarely occur without fever or with only slight elevation of temperature. Rapid pulse is always present.

2. Peritonitis develops with spread of poison, although it may be entirely absent. Indicates microbe invasion.

3. Other organs infected by the microbes, as kidneys, lungs, spleen, brain, with development of corresponding symptoms. The result of treatment can alone determine whether in any case the symptoms be due to the absorption of microbes or ptomaines; *i. e.* it is usually impossible to diagnosticate the absorption of ptomaines, as such, from the symptoms alone. Elevation of temperature throughout the puerperium may arise from many causes, but should be treated as septic until proven to be otherwise. In this climate it is most commonly mistaken for malaria.

A differential diagnosis between the forms of septic inflammation noted in the classification is always desirable, but not always possible. The following points may be remembered: Diphtheritic patches in the vagina can be seen, as also the characteristic appearance in superficial suppurative endocolpitis. If there is a foul odor to the discharge, fever, a large uterus (arrest of involution, long continuance of the bloody lochia), no signs of septic inflammation on vaginal walls, and the systemic symptoms are not very grave, it is probably sapræmia. This is practically certain to be the case if the symp-

toms develop late in the puerperium. But sapræmia is not always associated with a foul discharge. Profound depression, high fever, rapid pulse, absence of peritoneal symptoms, and no evidence of metastasis probably indicate diphtheritic endometritis, which can occur without the slightest trace of infection in the vagina or the visible portions of the cervix. The discharge is usually foul. The same symptoms with evidence of metastasis means metro-phlebitis. If in addition to the signs of endometritis the systemic symptoms grow worse, the womb becomes more sensitive on pressure, and has a boggy feel, there is very likely metritis. The symptoms of diffuse peritonitis are profound depression, usually fever (not necessarily and often of no great height), rapid running pulse, tympanites, abdominal tenderness (not always), vomiting, constipation, foul tongue, and a peculiar anxious, pinched expression. Consciousness is usually clear. Septic cystitis should be diagnosed without difficulty by the purulent urine, tenderness over bladder, frequent and painful micturition, fever, and an absence of signs to indicate infection of the genitalia proper. Septic proctitis may not be discovered until after death.

TREATMENT.

The indications are (1) to stop the manufacture of the ptomaines, which is best accomplished by destroying the microbes and, if necessary, removing their habitat, and (2) to sustain strength to aid the struggle between the body-cells and microbes.

Local Treatment meets the first indication, and is accomplished by *douches*, vaginal and intra-uterine, the use of the *curette*, *intra-uterine wipers*, *forceps*. In skilful hands the curette is best. Hirst's sharp curette requires some care and skill. Mundé's wire curette is less dangerous, but less effective. The uterine cavity may be wiped out with pledgets of cotton soaked in peroxide of hydrogen, if the os is widely opened.

The Operation.

1. The hands and arms washed with soap and water and with bichloride solution, 1 to 1000.

2. Vaginal Douche.—2 per cent. solution of creolin (five drachms to a quart of water), or corrosive-sublimite solution, 1 to 4000.

3. Fix anterior lip of cervix with double tenaculum.

4. Curette passed to fundus, and whole cavity of uterus gently scraped, using only the force of the thumb and first finger. Remove *débris* with forceps.

5. Intrauterine Douche.—Fountain syringe, a two-way catheter (Lentz or Bozeman), a quart of 2 per cent. solution creolin, or bichloride solution, 1 to 4000. If the latter be used, the uterus should always be immediately afterward washed out with sterilized water. Douches to be given once in twenty-four hours, or as often as necessary. In case of repeated douching creolin should be employed. It is sometimes of advantage, but not always necessary, to tampon the uterine cavity after disinfection with iodoform gauze, leaving an end hanging out of the cervix to secure drainage. Foci of septic infection in the vagina or cervix should always be looked for and cauterized thoroughly with strong solutions of silver nitrate (3j to 3j), or when diphtheritic with nitric acid or strong solutions of zinc chloride. A heavy dose of quinia should be given for the fever and to eliminate any malarial origin of the elevated temperature. When the symptoms are due to the absorption of ptomaines this treatment will be followed by their speedy disappearance. Occasionally it will be necessary to repeat the operation of disinfecting the parturient canal.

General Treatment.—When the symptoms continue, the second indication—in which the treatment is only palliative and symptomatic—is met by a *full diet* of milk, two or more quarts in twenty-four hours, if assimilated; partly digested, if necessary; and *large quantities of stimulants*, one pint or more in twenty-four hours, of whiskey, wine, or brandy; as much nutritious food as the patient can digest, and as large a quantity of alcoholic stimulants as the stomach can bear, with inhalations of oxygen and medicinal stimulants are necessary in severe attacks. With persistence cure can be effected occasionally in the most desperate cases.

For the *peritonitis* apply light poultices twice a day, with a stupe while the former are being changed. Sufficient opium to relieve pain is demanded. Bleeding and salines are too debilitating and, as a rule, should be avoided in septic peritonitis except in vigorous women and in the earliest stage of the dis-

ease. Suppuration requires laparotomy, which will probably be successful if the suppuration is circumscribed, but will be of no avail if it is diffuse. Treat other complications on general principles.

Special Treatment of the Different Forms of Septic Inflammations.—If the symptoms point clearly to one of the forms of septic inflammation, the treatment may be restricted to measures suitable to that form alone.

Prognosis.—Large majority of septic cases in general (about 75 per cent.) recover with appropriate treatment. As a rule, if temperature be high, internal organs involved, if there are repeated chills, the pulse weak and fluttering, the prognosis is more grave, but death may occur without these being present.

Some Peculiar Manifestations of Septic Infection.—

- (a) Phlegmasia Alba Dolens.
- (b) Puerperal Rheumatism.
- (c) Infectious Erythema.
- (d) Pemphigus.
- (e) Tetanus.
- (f) Suppuration of Pelvic Joints.
- (g) Ischio-rectal Abscess.

(a) *Phlegmasia Alba Dolens, or Milk Leg.*—There are two classes of cases:—

1. Thrombosis of veins of pelvis extending to the femoral vein.
2. Connective tissue of pelvis and thigh affected.

Symptoms.—From the tenth to the thirtieth day there develop a heaviness and stiffness in the leg, soon followed by swelling, occurring in different localities, at the ankle, gradually ascending to the groin (if due to thrombosis of the veins), or at Poupart's ligament, extending down the thigh (if due to involvement of the connective tissue). In the former case there is apt to be tenderness along the course of the femoral vein, which may also be marked by a line of inflammatory redness. Fever is evanescent, and usually disappears before swelling subsides. More frequently the left leg is affected. Sometimes both together, or one after the other.

Frequency.—Depends upon the care and cleanliness of the management of labor. The connective tissue variety much less frequent than the thrombotic variety.

Cause.—Septic infection of the genital region. Very likely an inflammation which involves only the bloodvessel walls (veins) and thus leads to thrombosis of the pelvic veins, extending to those of the lower extremities. The pressure to which the pelvic veins are subjected during pregnancy predisposes to inflammation by reducing the vitality of the walls. In some cases, especially those before labor, the pressure is the sole cause of the phlegmasia. It is claimed that the constitution of the blood during pregnancy favors thrombosis.

Prognosis.—Grave, death resulting from general septic infection, or embolism. About one-third die. Even in favorable cases the swelling of the limb may continue for years, becoming worse if much exercise is taken or work done, upon the feet. In exceptional cases elephantiasis of the limb develops after a time. If the obstruction to the return circulation through the femoral veins is not compensated for, gangrene may result, necessitating amputation.

Treatment.—The condition is asthenic in tendency, hence treatment should be supporting and stimulating. Enjoin absolute quiet and rest in bed to avoid embolism. Elevate the limb, wrapped in cotton, and when convalescent resort to cautious massage. In the connective-tissue variety fever is much higher; there is a tendency to suppuration which requires incisions and drainage. Abscesses may also develop in the phlebotic and thrombotic variety along the course of the femoral vein, in the popliteal space, or down the leg.

(b) *Puerperal Rheumatism.*—One of the large joints affected, usually the knee. There is a marked tendency to ankylosis or suppuration with general septic infection.

Cause.—It is a mild septic arthritis, such as is seen in the course of gonorrhœa.

Treatment.—Rest. Iodine and ointment of belladonna and mercury to the joint. Cautious passive motion after severe symptoms subside.

(c) *Infectious Erythema.*—*Symptoms.*—There are two varieties:

(1) Scarlet blotches of irregular outline, size of hand, occur in the course of general sepsis on face, abdomen, sometimes breasts, rarely extremities. (2) At first a punctate, becoming later a bright scarlet rash simulating scarlet fever. The eruption begins in the moist folds of the skin and lasts about three days. Fever ($99\frac{1}{2}^{\circ}$ to 100°) is evanescent and disappears before the eruption.

Treatment.—Cleanse parturient tract if indicated.

(d) *Pemphigus*.—Pemphigus blebs may appear a few days (usually four) after labor and may rapidly spread over the body. The constitutional symptoms are not severe. Is infectious. Other patients should be protected.

(e) *Tetanus*.—Due to entrance of tetanus bacillus.

(f) *Suppuration of Pelvic Joints*.—The symphysis more often involved.

Treatment.—The joint should be opened and properly drained.

(g) *Ischio-rectal Abscess*.—May appear in consequence of injury to this region during labor. May recur in subsequent confinements.

(B) *Puerperal infectious fevers in which the poison enters other channels* (i. e., not through wounds of genital canal, etc.). Includes any of the infectious diseases, as the exanthemata, malaria, erysipelas, etc. When these diseases occur during the puerperium, their course is often modified. Incubation is usually shortened and convalescence prolonged. Their diagnosis is always obscure, as they are apt to be confounded with sepsis; the germs of many of them, when introduced through wounds in the genital canal, producing about the same symptoms, and they are always more apt to invade the body from the genital region than in the usual manner. Their prognosis is more unfavorable. The puerperal patient is peculiarly liable to erysipelas or malaria. At the beginning to clear up doubtful cases of the latter, the following routine treatment is of practical value: Order blue mass gr. viij, quinine gr. x-xv, and an antiseptic vaginal douche. The following morning repeat the quinine and douche, and give a brisk saline cathartic.

PREVENTIVE TREATMENT OF INFECTIOUS PUERPERAL FEVER.

Secure absolute cleanliness of doctor, nurse, patient, instruments, atmosphere, etc.

Hands.—Washed with soap and water followed by immersion in alcohol and solution of bichloride 1 to 1000.

Instruments.—2 per cent. solution creolin, 5 per cent. carbolic solution or boiling water. In hospital work the bedding should be washed in bichloride solution, and the patient given a bath just before labor.

Atmosphere.—Selection of well-ventilated room is important. Use occlusive dressing of corrosive cotton and gauze, which should be changed frequently.

External Genitals.—Cleaned when each pad is applied, never using a sponge, but preferably baked cotton, or corrosive jute. Guard the patient from other infectious fever, *i. e.*, the physician should not go direct from an infectious disease, as scarlet fever, to an obstetric case.

II. *Non-infectious Fevers.*

The temperature of women during the puerperium is very variable, and easily influenced by causes which in health would have no effect.

Non-infectious puerperal fever may be due to :—

(a) Emotion.

(b) Exposure to cold and consequent internal congestion, especially of breasts and abdomen.

(c) Constipation.

(d) Reflex irritation. The irritation may have its source in an inflamed mammary gland or nipple ; it has been a tape-worm, and perforation of the uterus by a curette.

(e) Cerebral diseases. Hemorrhage or embolism.

(f) Eclampsia.

(g) Insolation.

(h) Syphilis.

(i) Exacerbations of acute or chronic diseases contracted during or before pregnancy.

Influence of Child-bearing upon Phthisis.—The laity believe it

to be favorable. This is not the fact. Pregnancy, the puerperal state, and lactation are a drain on woman's strength, and can cause the development of phthisis in those predisposed to it. If already present, the symptoms are exacerbated. Primary tuberculosis of the uterus, developing during the puerperium, has been noted.

SYLLABUS OF OBSTETRIC LECTURES.

LECTURES TO THE COMBINED CLASSES.

PART II.

Anatomy of the Pelvis Obstetrically Considered.

The *false pelvis* is that expanded portion situated above the ilio-pectineal line.

The *true pelvis* is that part of the cavity beneath the ilio-pectineal line.

I. POSITION.

The obliquity to the horizon in the erect posture is 55° at the superior strait, 10° at the inferior strait.

II. SHAPE.

The false is irregularly funnel-shaped, exerts no special influence on the course of labor, and is accessory to the true, serving to direct the presenting part into the true. The true is similar to a truncated cylinder, five inches in depth behind, one and a half in front, and three and a half laterally.

The shape of the inlet or superior strait is most frequently cordiform. May be circular or elliptical. The shape of the cavity is irregularly circular, and the outlet or inferior strait is cordiform.

III. SIZE.

(a) *Inlet*.—The *antero-posterior* or *conjugate diameter*, measured from the upper edge of the promontory of the sacrum to a point

an eighth of an inch below the upper border of the symphysis, is 11 cm. The *transverse*, the longest possible transverse distance, is $13\frac{1}{2}$ cm. The *oblique*, from upper edge of one sacro-iliac junction to opposite ilio-pectineal eminence, is $12\frac{3}{4}$ cm.

(b) *Cavity*.—The plane of pelvic expansion perforates the middle of the symphysis, tops of acetabula, and the sacrum between the second and third vertebræ.

Diameters : antero-posterior $12\frac{3}{4}$ cm. ; transverse $12\frac{1}{2}$ cm.

The plane of pelvic contraction passes through tip of sacrum, spines of ischia, and under surface of symphysis.

Diameters : antero-posterior $11\frac{1}{2}$ cm. ; transverse $10\frac{1}{2}$ cm.

(c) *Outlet*.—Antero-posterior $9\frac{1}{2}$ cm. ; transverse 11 cm.

IV. DIRECTION OF PELVIC CANAL.

Represented by a curved line parallel to concave surface of sacrum, and equally distant from sides of pelvis.

Development of Adult Pelvis.—The foetal pelvis represents a funnel, and the development of the irregularities and peculiarities of the adult pelvis may be accounted for by three factors, viz. :—

(a) Weight of the body, (b) counter-pressure of the femora, (c) force exerted by the ligaments. The sacral curve and lateral aspects are thus explained.

THE BONY PELVIS FILLED WITH SOFT TISSUES.

(a) *Muscles*.—Ilio-psoas, obturator internus, pyriformis coccygeus, levator ani, retractor ani, sphincter ani, constrictor vaginae, transversus perinei. The levator ani plays a most important part in the sexual life and physiology of woman. A vigorous contraction of this muscle pulls the rectum and vagina towards the symphysis, and, when distended during labor, serves to direct the head out under the symphysis, thus relieving the strain on the perineum. It is active during the orgasm in the female, and directs the male organ toward the cervical canal.

During parturition the function of the muscles of the *pelvic canal* (ilio-psoas, obturator, pyriformis, etc.) is mechanical. They serve as bumpers or protectors to the bony wall, and deflect the presenting part in the most favorable direction for its

expulsion. The situation of the ilio-psoas muscles diminishes the transverse diameter of the inlet, so that in the pelvis during life the diagonal is the greatest diameter, thus explaining the great frequency of oblique positions of the presenting part. These muscles on either side subtract about $2\frac{1}{2}$ cm. from the oblique and about 5 cm. from the transverse diameter. They are subject, however, to some displacement and compression during labor.

The muscles of the *pelvic floor* (levator ani, coccygeus, transversus perinei, etc.) are passive, in one sense, during parturition. They yield only outward and backward, and by resisting the passage of the presenting part, are frequently lacerated, yet the direction of their resistance serves to deflect the head outward and upward under the symphysis.

(b) *Ligaments*.—The *obturator membrane* closes the foramen and serves as a cushion to protect the presenting part. The *sacro-sciatic ligaments* close the pelvic wall, afford protection and give direction to the presenting part.

(c) *Connective Tissue*.—A knowledge of the distribution of the pelvic fascia is of importance in determining the course of extension of interstitial bleeding or absorbed infecting organisms. From both sides of the uterus the connective tissue extends in three directions. Laterally, it is included in the broad ligament, and, travelling along the round ligament, it reaches the mons veneris and inguinal region. Anteriorly, it skirts the bladder and is continuous with the subcutaneous connective tissue of the abdominal wall. Posteriorly, it skirts the rectum, is included in the meso-rectum, and is continuous with the connective tissue of the posterior abdominal wall. It also follows the three canals which perforate the pelvic floor, the urethra, vagina, and rectum, and thus is continuous with the subcutaneous connective tissue of the external genitalia and perineum.

(d) *Bloodvessels*.—The *ovarian arteries*, leaving the abdominal aorta, enter the pelvis on either side, and passing between the laminae of the broad ligament, are distributed to the ovaries and tubes, a branch going to the fundus, another traversing the uterus to anastomose with a branch of the uterine artery. The uterine artery passes downward from the anterior trunk of the

internal iliac to the neck of the uterus. Ascending the sides of the uterus, a branch meets the ovarian, and a branch, *the circular artery of the cervix*, supplies the cervix. The latter is sometimes ruptured during labor, or cut during operations upon the cervix, and gives rise to profuse hemorrhage. The venous supply to the pelvis is very abundant.

(e) *Lymphatics*.—Important in their relation to septic absorption. The lymph spaces of the uterus, lying between connective-tissue bundles, and covered with endothelial cells, empty, by means of their ducts, into the lymphatic glands. These lead to the thoracic duct. The most important glands are the uterine, inguinal, obturator, hypogastric, lumbar, and sacral. Infection occurring in the lower fourth of vagina the poison spreads through the inguinal chain of lymphatics; above the lower fourth the poison travels through the other plexuses which are so freely anastomosed as not to be differentiated. Spreading along obturator muscle, abscesses appear on buttock or thigh (rare).

(f) *Nerves*.—Principally from sympathetic system. The uterine plexus sends off the two hypogastric plexuses, and from these filaments pass to ovaries and uterus.

Deformities of the Pelvis.

Frequency.—13 to 14 per cent.

(Classification of Schauta.)

A. ANOMALIES OF THE PELVIS THE RESULT OF FAULTY DEVELOPMENT.

- (1) Simple Flat.
- (2) Generally Equally Contracted (*justo-minor*).
- (3) Generally Contracted Flat (*non-rachitic*).
- (4) Narrow Funnel-shaped.
Fœtal or Undeveloped.
- (5) Imperfect Development of One Lateral Mass of Sacrum.
(Nægele's Pelvis.)
- (6) Imperfect Development of Both Lateral Masses. (Roberts's Pelvis.)
- (7) Generally Equally Enlarged (*justo-major*).
- (8) Split Pelvis.

B. ANOMALIES DUE TO DISEASE OF THE PELVIC BONES.

- (1) Rachitis.
- (2) Osteomalacia.
- (3) New Growths.
- (4) Fractures.
- (5) Atrophy, Caries, and Necrosis.

C. ANOMALIES IN THE CONJUNCTION OF THE PELVIC BONES.

(a) Too firm union (synostosis). Apt to be found in elderly primiparæ, particularly at the sacro-coccygeal joint.

- (1) Of symphysis.
- (2) Of one or both sacro-iliac synchondroses.
- (3) Of sacrum with coccyx.

(b) Too loose a union or separation of the joints.

- (1) Relaxation and rupture.
- (2) Luxation of the coccyx.

D. ANOMALIES DUE TO DISEASE OF THE SUPERIMPOSED SKELETON.

- (1) Spondylolisthesis.
- (2) Kyphosis.
- (3) Scoliosis.
- (4) Kypho-scoliosis.

E. ANOMALIES DUE TO DISEASE OF SUBJACENT SKELETON.

- (1) Coxalgia.
- (2) Luxation of One Femur.
- (3) Luxation of Both Femora.
- (4) Unilateral or Bilateral Club-foot.
- (5) Absence or Bowing of One or Both Lower Extremities.

The *simple flat* pelvis is the most frequent variety in this country. The contraction is at the conjugate diameter of the inlet. The narrow, *funnel-shaped* pelvis occurs in those whose bony development has ceased or in those who never have walked. In the latter the three developmental factors which produce the normal adult pelvis have been inoperative. In the *split* pelvis

the deformity is at the symphysis and is associated with extrophy of the bladder. The characteristics of the *rachitic* pelvis are: excessive rotation of the sacrum on its transverse axis, resulting in an abnormal projection of the promontory and increased sacral curve; decrease in depth of pelvic cavity; the curve of the iliac bones is exaggerated and their anterior spines more widely separated. This form and the generally contracted are next in frequency to the simple flat in this country. The greatest contraction is in the conjugate at the brim. *Osteomalacia* is very rare in this country. It gives rise to the "beak-like" projection at the symphysis. The *new growths* causing deformity may be any of the tumors that can develop from bone. Small nodules on the promontory or spines of ischia may lacerate the soft parts or puncture the child's head.

When the *pelvic joints* are *too firmly united* the physiological loosening which happens during the latter months of pregnancy cannot occur. *Anchylosis of the sacro-coccygeal joint* is not infrequent in old primiparæ. *Spondylolisthesis* is a slipping down of the last lumbar vertebra into the pelvic cavity. The finger in the vagina can often feel the bifurcation of the aorta. In *kyphosis* the weight of the body is from above downward and from before backward. The sacrum is thus pushed backward, is narrowed, tuberosities of the ischia approach each other, increasing the diameters of the inlet but diminishing the outlet, particularly in its transverse diameter. The distortion resulting from *scoliosis* is a lateral displacement of the promontory giving rise to an oblique deformity. *Lordosis* is the compensatory curve associated with kyphosis.

Pelvimetry.

TABLE OF MEASUREMENTS.

Pelvis.

Iliac spines, 26 cm.

Iliac crests, 29 cm.

External conjug., $20\frac{1}{4}$ cm.

Internal conjug., diagonal, $12\frac{3}{4}$ cm.

True conjug., estimated, 11 cm.

Right diagonal, 22 cm.

Left diagonal, 22 cm.

Between Trochanters, 31 cm.

Circumference of Pelvis, 90 cm.

An accurate measurement of the pelvis by means of the pelvimeter will disclose any change in shape or size of the pelvis, indicate the degree of the deformity, and thus influence the treatment. The measurements are made externally and internally between certain bony prominences. The varying factors in the external measurements to be taken into consideration are the thickness of the skin, subcutaneous tissue, and the bones.

Estimation of the Size of the Inlet.—An approximate idea of the transverse diameter is gained by measuring externally between the anterior superior spinous processes of the ilia (26 cm.); between the crests of the ilia where they are most widely separated (29 cm.); between the two trochanters (31 cm.). The transverse diameter may be determined more accurately by an internal measurement called the *internal ascending oblique* (Löhlein). This is measured, by the finger in the vagina, from the centre of the sub-pubic ligament to the upper anterior corner of the great sacro-sciatic foramen. The transverse is 2 cm. longer than this diameter.

An idea of the length of the *antero-posterior* diameter of the inlet is derived from the *external conjugate*, measured from the depression under the spine of the last lumbar vertebra to the upper edge of the symphysis ($20\frac{1}{4}$ cm.). The internal measurement for estimating the antero-posterior diameter is made by the fingers reaching from the middle of the sub-pubic ligament to the top of the promontory, and is called the *internal conjugate diagonal* ($12\frac{3}{4}$ cm.). This diameter is necessarily longer than the true conjugate, and it has been found that by subtracting $1\frac{3}{4}$ cm., the true conjugate is estimated. The possible sources of error in thus estimating the true conjugate are found in the fact that the internal conjugate diagonal does not take into account the height and angle of the symphysis, two factors which obviously influence the length of the true conjugate, while they have no

effect upon the diagonal conjugate. Normally the height of the symphysis is 4 cm., and its angle 105° (conjugato-symphyseal angle).

If this were always the case, subtracting $1\frac{3}{4}$ cm. from the measured internal conjugate diagonal would be absolutely correct. As a matter of fact, both the height and the angle vary, and by the following rules the true conjugate can be accurately determined.

For every .5 cm. increase in the height of the symphysis above the normal, add .3 cm. to $1\frac{3}{4}$ cm., and subtract the sum from the measured internal conjugate diagonal. The converse of this is applicable to a decrease in height of the symphysis.

For every degree of increase of the conjugato-symphyseal angle above the normal, add half that number of mm. to $1\frac{3}{4}$ cm., and subtract the sum from the measured internal conjugate diagonal. The converse of this is also true.

The *oblique* or *diagonal* diameters may be measured externally from the posterior superior spinous process of the ilium to the opposite anterior superior spine (22 cm.).

Estimation of the Size of the Cavity.—No external points of measurement. Its general size, or the presence of a tumor, is learned by a vaginal examination.

Estimation of the Size of the Outlet.—As it is increased in many varieties of deformity, and but rarely contracted, external measurements are not required in the vast majority of cases. It is decreased in the kyphotic pelvis. The distance between the tuberosities of the ischia (11 cm.) is ascertained by Chantreuil's method: placing the two thumbs on the tuberosities, and an assistant measures the distance between them.

Chief diagnostic points of the commoner forms of pelvic deformity.

Simple Flat Pelvis.—The external conjugate will be less than $20\frac{1}{4}$ (19 or 18) and the internal conjugate diagonal less than $12\frac{3}{4}$.

Flat Rachitic.—The external conjugate lessened (18 or under). Internal conjugate diagonal lessened (11 or under). Conjugato-symphyseal angle is increased; about 2 cm., not $1\frac{3}{4}$ cm., is subtracted. The relation of the distances between the spines and crests is disturbed. These measurements in the ordinary type in this country will be about 25 and 26.

94

Justo-minor.—All the diameters less, but normal relation maintained.

Justo-major.—All diameters increased, but normal relation remains.

In private practice it is by no means necessary accurately to measure the pelvis of every pregnant woman. When, however, there exist evidences of some deformity, as rachitis, kyphosis, coxalgia, a history of grave difficulty in previous labors, etc., a vaginal examination should be made to estimate the conjugata vera, and other measurements taken as may be indicated.

Fœtometry.

TABLE OF MEASUREMENTS.

Child.

Length	.	.	.	.	.	.	50 cm.
Bisacromial	.	.	.	.	.	.	12 "

Head.

Bitemp.	.	.	.	.	.	.	8 cm.
Bipariet.	.	.	.	.	.	.	9 $\frac{1}{4}$ "
Occip. front.	.	.	.	.	.	.	11 $\frac{3}{4}$ "
Occip. mental	.	.	.	.	.	.	13 $\frac{1}{2}$ "
Trachelo-bregm.	.	.	.	.	.	.	9 $\frac{1}{2}$ "
Circumference, occip., front.	.	.	.	.	.	.	34 $\frac{1}{2}$ "

The weight of mature infant is 3250 gm.

In connection with the size of the pelvis, a second important factor influencing the difficulty of labor is the size of the fœtus, particularly of its head.

Estimation of the Size of the Fœtus.—An approximate idea of its size can be determined by abdominal palpation.

When the head has not engaged, its relative size to the inlet, which is of obvious importance, may be discovered by an effort to push it through the superior strait.

Anomalies of the Soft Parts.

Anatomical anomalies of the maternal soft parts engaged in parturition may be the following:—

Uterus didelphys (double uterus; failure of union of ducts of Müller; separation throughout entire genital canal).

Uterus bicornis duplex (the two uteri in juxtaposition, a septum dividing them).

Uterus bicornis unicollis (bifid uterus; imperfect union of ducts giving bifid form).

Uterus unicornis. One duct arrested in development, or there may be partial development of one horn (rudimentary horn).

Uterus cordiformis (arcuate uterus; fundus not developed; its surface depressed).

Uterus incudiformis (anvil shaped).

Uterus septus (subseptus, partitus, semipartitus, etc.; dividing septum present, wholly or in part).

The vagina is divided by a longitudinal septum in cases of uterus didelphys, uterus bicornis duplex, and sometimes in cases of uterus subseptus. The vagina and cervix may be divided longitudinally without division of the uterine cavity. Incomplete transverse septa of the vagina are sometimes seen.

Antisepsis.

Mortality of Septic Infection.—In large cities the average death-rate of confinement cases is about one per cent., the greater proportion being due to septic infection. In Philadelphia about thirty thousand women are annually confined at term, and of these between two and three hundred die from septic infection.

Functions of Micro-organisms.—The widespread distribution of micro-organisms is now well known, and investigation has shown their chief function to be disintegrators and destroyers of dead animal and vegetable matter.

Ptomaines.—In their work of disintegrating and destroying dead animal matter, poisonous products are produced, called animal alkaloids or ptomaines (πτομα, dead body). When the latter are absorbed, they give rise to various pathological and clinical manifestations, some proving fatal to animal life, others causing a rise of temperature, etc.

Phenomena Resulting from Microbe Invasion.—The cells of liv-

ing matter resent their invasion and a struggle for supremacy begins. By their higher specialization for greater resistance, the skin and mucous membranes ordinarily serve as barriers to their entrance, but if these are passed, the more delicate and less resisting cells take up the combat. The result is largely dependent upon the extent of invasion, the virulence of the microbe, and the individual power of resistance of the living cells.

Invasion in Puerpera.—The examining hand may be infected, and through the placental site or lacerations of the parturient canal an entrance into the general system is effected. A fatal result in every case is avoided, in two ways: As a rule, the examining hand is not infected with the particularly virulent varieties, and in many cases the living cells are able to resist the germs that may have gained access. These elements of safety are invalidated, however, by the following facts: The germs that may have been introduced, when at their work of disintegrating the dead animal matter, as clots, shreds of membrane, deciduæ, etc., grow, multiply, and increase in virulence, and the power of resistance of the vital cells varies in different individuals. Therefore, it is impossible to predict the character of the germ that may be absorbed, whether virulent or otherwise, and in no case can we know an individual's power of resistance. With so much uncertainty surrounding every case, it is obviously necessary to apply our knowledge of germicides, and endeavor to prevent the introduction and further development of micro-organisms.

TABLE OF COMPARATIVE GERMICIDAL POWER.

In solutions of justifiable strength.

Bichloride of mercury,
Creolin, composed of coal tar, resin soap, fat soap,
and caustic soda,
Thymol,
Benzoate of sodium,
Salicylic acid,
Carbolic acid.

The bichloride of mercury is effective but dangerous. Creolin

is probably as powerful as the bichloride ; thus far has been found much less dangerous, and is therefore recommended.

Application of Antisepsis to Obstetrics.—The advantages of antiseptic precautions in obstetric practice have been clearly demonstrated by an enormous reduction of mortality since its employment has become so general. At one time in the Vienna Hospital the mortality was one death in nine cases ; now it is .3 per cent. In the Paris Maternité it has been ten per cent., while recently in the same hospital there were 1000 cases without a death. At the Philadelphia Hospital the mortality has been reduced from 7 per cent. to less than 1 per cent. Semmelweis, the originator of antiseptic practice in obstetrics, accomplished the following striking reduction in mortality in his hospital by requiring students to disinfect themselves before attending the cases :—

Year.	Confinements.	Deaths.	Per Cent.
1846	4010	459	11.4
1847	3490	176	5.
1848	3556	45	1.27

ANTISEPSIS IN HOSPITAL PRACTICE.

(a) *Disinfection of the Patient.*—When the signs of beginning labor manifest themselves, the patient should receive a bath and be supplied with clean clothes. After labor is completed the vagina should receive one douche of 2 per cent. solution of creolin by means of a fountain syringe, preferably of glass, the vaginal tube also of glass, with lateral perforations. If an intrauterine injection be required, the glass tube, a two-way metal catheter or stiff rubber catheter, may be used, preferably with a fountain syringe.

(b) *Disinfection of the Bed.*—The lying-in bed should contain the following : 1, a pad about a yard square, composed of an upper layer of flannel, a piece of blanket and a layer of mackintosh, all to be soaked in bichloride solution, 1 to 2000, and dried before using ; 2, a sheet covering ; 3, a rubber blanket ; 4, a second sheet, and under this, 5, another rubber cloth, to protect the mattress.

(c) *Disinfection of the Attendants.*—The hands and wrists of doctor and nurse washed in warm water with soap and brush ;

nails pared and cleaned; hands and wrists rinsed in alcohol and placed in bichloride solution, 1 to 1000, for at least one minute, after which they should not be dried on septic towels, etc.

(d) *Disinfection of Instruments*.—If not easily corroded, soaked in bichloride solution, 1 to 1000; otherwise, immerse in boiling water or use 5 per cent. solution of carbolic acid. This applies to all instruments used in vagina, urethra or rectum.

Protection after Labor.—The pads which receive the lochia should be changed six times in twenty-four hours for three days, and less frequently subsequently as may be needful. Protect the parturient tract from invasion by the *occlusive dressing*, or vulvar pad, composed of sublimated gauze, and corrosive cotton within this, to protect vulvar opening. In private practice carbolized gauze and salicylated cotton may be substituted to avoid a vulvar dermatitis. The dressing to be changed six, seven or eight times daily for the first three days and less frequently afterward. When changed, the external genitalia should be washed several times daily with baked cotton and bichloride solution 1 to 2000.

ANTISEPSIS IN PRIVATE PRACTICE.

The patient, nurse, clothing, etc., are usually sufficiently clean. Avoid infecting the patient by thorough personal disinfection of doctor, nurse, and instruments. An occlusive dressing should be used to prevent infection from the atmosphere. The woman should lie upon a pad or folded sheet, which can be changed frequently. The vulvar pad should be changed six or seven times a day for the first three or four days, and the external genitalia be washed off with a warm corrosive sublimate solution. A vaginal douche is not necessary in a normal case. The lying-in room should not contain a stationary washstand nor be in close proximity to water-closet. An open fireplace is desirable.

Diagnosis of Pregnancy.

SUBJECTIVE SIGNS.—Arranged in the order of their relative importance.

(A) *Cessation of Menstruation.*—Is the most valuable of the subjective signs, but is not always to be depended upon. It may occur independently of pregnancy, in immigrants experiencing a sudden change in climate; in various mental disorders, as hysteria, mania; as the result of old peri-uterine inflammation; it often accompanies phthisis.

In pregnancy the menstrual discharge may occur during the first three months. Sometimes this may be due to failure of union of the deciduæ. Rarely it may continue throughout the whole period of gestation.

(B) *Nausea and Vomiting.*—Are reflexly associated with the developing fœtus, and occur usually at the 6th or 7th week. They may occur reflexly from other conditions, as a displaced uterus, an organ which is badly inflamed, congestion or inflammation of the tubes and ovaries, growing tumors within the pelvic cavity, etc. They may be altogether absent, yet rarely in some individuals they appear so early, and with such promptness and regularity, as to constitute a most valuable sign.

(C) *Changes in Size and Shape of Abdomen.*—At first hypogastric flattening, due to sinking of the uterus in the early weeks from its increased weight. This is associated with irritability of the bladder. Later the abdomen is enlarged, which may be due to other causes, as deposition of fat, accumulation of fluids, various tumors, etc.

(D) *Changes due to Increased Blood Supply to the Genitalia and Breasts.*—These are tingling and a sensation of fulness in the breasts, with the development of colostrum; leucorrhœa; increased temperature of the genitalia. Are of comparatively little value.

(E) *Quickening.*—Is the sensation experienced by the mother as the result of fœtal movements, and usually first appears between the fourth and fifth months. Not experienced in some patients. Movements of intestines may simulate, particularly in hysterical women.

(F) *Alterations in the Nervous System.*—Changes in disposition, mental peculiarities, perversion of taste. A disposition to faint and actual syncope. *All these subjective and some of the objective signs of pregnancy may be simulated in cases of pseudo-eyes or spurious pregnancy.*

OBJECTIVE SIGNS.—Are of much more importance and value. Are obtained by employing the senses of *sight, touch, and hearing.*

(A) *Inspection.*

(a) *Face.*—Chloasmata, splotches of irregular pigmentation on brow and cheeks. Development of the dark rings under the eyes. (b) *Breasts.*—Enlarged; veins distended and tortuous; nipple prominent; deposition of pigment—widening the areola and developing the secondary areola. Enlargement of the glands of Montgomery; presence of colostrum. All these signs can be manifested independently of pregnancy, and rarely may be absent. (c) *Abdomen.*—Is *pear-shaped*, with the narrow end downward; tumor is situated in the median line, spreading with approximate equality to either side. Striæ are present. The *umbilicus* at the sixth month is level with the surface of the abdomen and later pouts. It is surrounded by a ring of pigmentation which spreads above and below along the linea alba.

Fœtal movements can be seen if the pregnancy be far advanced. In the latter months the mucous membrane of vagina and vulva is violet or purple.

(B) *Touch.*—(a) *Abdominal palpation.* By this method are learned the size and shape of the uterus; in advanced cases, the position of the fœtal back, head and extremities; the intermittent uterine contractions (Braxton Hicks); fœtal movements.

Braxton Hicks's sign is available by the last of the third month, and although it may be produced by any tumor which sufficiently distends the uterine wall, as a collection of blood, soft fibroma, etc., it is almost a positive sign. It may, however, occur sympathetically in extra-uterine pregnancy and it is said that the contractions of an irritable distended bladder may be mistaken for the rhythmical contractions of the gravid womb. Fœtal movements are absolutely diagnostic.

(b) *Combined examination.*—(1) *Softened cervix.*—Caused by the increased blood supply and œdema. A ready rule of prac-

tice is, that "when the cervix is as hard as one's nose, pregnancy does not exist; when soft as one's lips, pregnancy is probable" (Goodell). Rapidly-growing myomata, acute metritis, hæmatometra, can thus simulate pregnancy by softening the cervix.

(2) *Hegar's sign*. This is a softening of the lower uterine segment, which is situated between the cervix and the upper uterine segment. Can be elicited by the forefinger in the rectum, thumb in the vagina, and pressure on the fundus above. (3) *Enlargement of the uterus, with change in shape and consistency*. In the early months deposition of lymph upon the uterus may lead to an error in diagnosis. (4) *Ballottement*. With one hand over the fundus, and the fingers of the other in the vagina, an impulse is communicated to the contents of the uterus by the vaginal hand, when the foetus will be felt to strike the fundus, and returning, will impinge upon the vaginal hand. This is a positive sign, and is available in the fourth month. A small cystic tumor of the ovary, with a long pedicle, and an extra-uterine gestation, are possible sources of error.

(C) *Auscultation*.—(a) *Fœtal heart sounds*. Rate, 120 to 160 per minute. Available in the fifth month. The third positive sign. Are to be distinguished from the pulsations of the abdominal aorta. The area of their maximum intensity in anterior positions of the vertex is an inch below the umbilicus, to the left or right; in posterior positions, in the flanks, on a line which passes through the umbilicus. Their absence does not exclude the existence of pregnancy. (b) *Dulness on percussion*.

A positive diagnosis of pregnancy before the sixth week is impossible.

Clinically, the signs of pregnancy may be divided into three trimesters or periods of three months each.

The 1st.—Will manifest the following signs: enlargement and bogginess of the uterine body; soft cervix; enlargement of the breasts; nausea and vomiting; Hegar's sign; cessation of menstruation.

The 2d.—In addition to above. Braxton Hicks's sign; feeble fœtal movements; ballottement; heart sounds; blue discoloration of vaginal mucous membrane.

The 3d. All the above present to a greater degree; outlines

1. Total number of ...
2. Population ...
3. Total ...

of foetal body distinguishable by abdominal palpation; presenting part to be felt through roof of vaginal vault.

Estimation of the Duration of Pregnancy.—Ordinarily the cessation of menstruation is depended upon. A convenient rule for predicting the date of the confinement is to count back three months from the date of *appearance* of the last menstrual flow, and add seven days (Naegele). An approximate idea may also be gained by noting the height of the fundus:—

4th month, midway between umbilicus and symphysis.

6th month, on a level with the umbilicus.

7th month, midway between umbilicus and xyphoid.

8th month, at the xyphoid.

9th month, descends almost to the depth at which it was at the 7th month, the presenting part having entered the superior strait.

Diagnosis of Life or Death of the Fœtus.—The foetal heart-sounds are the most valuable sign when heard. Positive knowledge of foetal movements is also of great value (see page 40). Knowledge of the life or death of the fœtus is often of great importance when complications arise whose treatment may require the termination of pregnancy, as nephritis, etc.

Diagnosis of the Situation of the Developing Ovum.—Whether intra- or extrauterine (see Extrauterine Pregnancy).

Diagnosis of a Prior Pregnancy.—Of medico-legal value. (a) Cervix lacerated, usually laterally. (b) Cervical canal irregularly enlarged, usually admitting first joint of index finger. Striæ pale and glistening; evidently old scars.

Physiology of Pregnancy.

Alterations in organs and tissues in consequence of pregnancy.

(A) Local Changes.

I. UTERUS.

(a) *Development of Constituent Parts.*—1. Muscle. Fibres hypertrophied eleven times as long, five times as broad as those

of the non-pregnant uterus. The theory of an additional hyperplasia of these structures has never been actually demonstrated.

2. Connective tissue. Increased chiefly by absorption of fluid and consequent increase in bulk.

3. Peritoneal covering. Increased by both hypertrophy and hyperplasia of the constituent elements.

4. Bloodvessels.—Arteries increase in calibre, length, and tortuosity. Veins grow to a very large size; their covering is reduced to the intima. They are surrounded by the uterine muscle, which obliterates them after labor.

5. Nerves. Increased more by a development of the connective tissue about them (neurolemma) than by an increase of the nerve elements.

6. Lymphatics. Increased by hypertrophy and hyperplasia. The lymph spaces below the uterine mucous membrane are enormously enlarged, and the lymph-tubes leading from them through the uterine muscles reach the size of a goose-quill. These lymph-tubes or vessels are collected in a plexus beneath the peritoneum, which is continuous with the general lymphatic system.

This arrangement and development explain the remarkably rapid absorption of the uterus after labor, and account for the ready absorption of infecting material, with peritonitis oftentimes as an early symptom.

(b) *Anatomy of the Uterus at Full Term.*—The muscle fibres of the non-pregnant uterus have a very irregular distribution. In the pregnant womb three layers may be distinguished—an outer, middle, and internal layer. The outer is continuous with the muscular fibres in the round ligaments and tubes, and is mainly longitudinal in arrangement. The middle layer is composed of bundles, which pass from their peritoneal attachment obliquely downward and inward to be attached to the submucous tissue. Above the “contraction ring” this oblique arrangement is less marked, while below it is more pronounced. The internal layer is thin and poorly developed, except at definite points. Its arrangement is chiefly circular, and is specially developed at the openings of the tubes and internal os.

(c) *Changes in Volume, Capacity, and Weight.*—Before impreg-

1. *Protein of 1.00*
2. *Protein of 1.00*
3. *Protein of 1.00*
4. *Protein of 1.00*
5. *Protein of 1.00*
6. *Protein of 1.00*
7. *Protein of 1.00*
8. *Protein of 1.00*
9. *Protein of 1.00*
10. *Protein of 1.00*

nation the length of the uterine cavity is about $2\frac{1}{2}$ inches ; at term, it is increased to 12 inches ; while its breadth is 9 inches and depth 8 inches. The capacity changes from 1 cubic inch to 400 cubic inches ; weight from about 2 ounces to 2 pounds.

(d) *Changes in Form, Position, Direction, and Topographical Relations.*—From flattened pyriform to spherical or fig-shaped, and, finally, ovoidal. During the early months the position of the uterus is altered by sinking into the pelvic cavity, as a result of the increased weight. After the third month it rises until it is almost in contact with the diaphragm, and before term (four weeks in primiparæ, ten days or one week in multiparæ) sinks again into the pelvic cavity, owing to the engagement of the lower portion of the uterus with the contained presenting part of the fœtus within the pelvic canal.

After the third month the laxity of the abdominal wall allows it to fall forward. In consequence of the position of sigmoid flexure and rectum, it is slightly tilted to the right and rotated on its longitudinal axis. The topographical relation of the intestines is important. They are always situated above and behind the uterus, thus giving no resonance over the anterior abdominal wall.

II. ALTERATIONS IN THE CERVIX.

Is softened, but its canal is undilated until the first stage of labor is well advanced.

III. ALTERATIONS IN VAGINA AND VULVA.

Changes due to increased blood supply, as noticed in enumerating the signs of pregnancy, as darkened color, increased secretion and over-development in the muscular and mucous walls.

IV. PELVIC JOINTS.

Loosening of their connections and increase in motility, thus facilitating the passage of the fœtal body.

V. ABDOMINAL WALLS.

(a) *Stretching of all the constituent parts*, with the formation of striæ, resulting, as was formerly supposed, from cracks in the

subcutaneous connective tissue and deeper layers of the skin, but now believed to be due to thinning and disorder of the arrangement of the connective-tissue layer of the skin. If the stretching is painful, relief is afforded by inunctions with cocoa butter, sweet oil or vaseline, to increase the pliability of the skin.

(b) *Separation of the recti muscles.*—Exceptionally, the abdominal contents may be extruded.

(c) *Increased deposition of fat*, as in other parts of the body. This is probably nature's provision for sustaining the woman during the first few days of the puerperium.

VI. BLADDER AND RECTUM.

The growth of the pregnant uterus mechanically interferes with their functions, hence irritability of the bladder and constipation are frequent. By interfering with their blood supply, hemorrhoids may develop, not only of the anus and rectum, but of the bladder as well, which rarely give rise to hemorrhage.

(B) Changes in the Several Systems of the Body. General Changes.

I. CIRCULATORY SYSTEM.

(a) *Blood.*—Whole quantity increased. Water and fibrin-making elements increased; red corpuscles relatively diminished; hæmoglobin diminished; white corpuscles actually and relatively increased.

(b) *Heart.*—Left side said to hypertrophy, and, in consequence of unusual determination of blood to the brain, there are developed on the inner table of the skull new formations of bone, called osteophytes. It has been claimed that the pulse of a pregnant woman does not undergo the usual acceleration when the patient changes from an horizontal to erect posture. (Jorissenne's sign of pregnancy.) This is of no value. The pregnant woman is liable to cardiac nerve storms.

II. URINE.

Becomes more watery; specific gravity diminished; quantity

July 1st 1881. A fine day.
The weather is so hot & the
sun is so bright that the
water is almost boiling.
The water is so hot that the
fish are almost cooked.

of urea normal. The kysteinic pellicle is no longer regarded of any diagnostic value.

III. DIGESTIVE SYSTEM.

Nausea and vomiting; torpor of intestines and rectum, inducing constipation.

IV. NERVOUS SYSTEM.

Alterations in disposition; perversions of taste; disposition to melancholia; severe neuralgias, especially of the face and teeth.

V. CHANGES IN WEIGHT.

An increase of $\frac{1}{13}$ part of the original body weight (Gassner). This estimate is not uniformly correct, as irregularities are frequently met with.

VI. CHANGES IN THE RESPIRATORY APPARATUS.

Lungs are shorter but broader, leaving the capacity unchanged; alterations in the expired air of no clinical importance.

(C) Prolongation of Pregnancy and Missed Labor.

Pregnancy is quite commonly prolonged. It may have a duration of 320 days, or 40 days above the average. In about 6 per cent. of women the duration is over 300 days. The result may be most serious in consequence of overgrowth of the fetus. *Missed labor* means the occurrence of a few labor pains at term, their subsidence and the retention of the product of conception in utero for a varying period thereafter. "Missed labor" usually turns out to be extrauterine pregnancy or pregnancy in one horn of a uterus bicornis; it may be due, however, to obstructed cervix from cancer, conglutination, etc.

(D) The Management of Normal Pregnancy

comprises correction of constipation, examination of urine, advice in regard to exercise, diet, exposure to cold and wet.

Tonic remedies are sometimes called for. Phosphate of lime is administered by some routinely, and strychnia in latter months is claimed to beneficially influence labor and puerperal involution. The nipples should be prepared for their future function by application of glycerole of tannin and water, equal parts, twice a day for four weeks preceding confinement.

Pathology of Pregnancy.

I. Diseases of the Genitalia.

1. **DISPLACEMENTS OF THE PREGNANT UTERUS.**—It may be displaced forward, backward, to either side, downward. It may form part of the sac contents in inguinal and ventral hernia, and may be twisted upon the cervix.

(a) *Anteflexion*.—Usually the growth of the uterus replaces the organ spontaneously, but when bound down by bands of adhesive inflammation, pain and difficulty in urination result, until finally the uterus expels its contents, or forces its way up into the abdominal cavity.

Treatment.—Massage, and efforts to replace it through the vaginal vault. Late in gestation the whole body of the uterus may fall forward, producing a pendulous abdomen, in consequence of greatly relaxed abdominal walls, diminution in the length of the abdominal cavity, as in kyphosis, prevention of the entrance into pelvis of presenting part, as in rachitic pelvis, or separation of the recti muscles. Treated by abdominal binder.

(b) *Retroflexion or Retroversion*.—Of rather frequent occurrence. Explained almost invariably by the previous existence of such a displacement.

Symptoms.—The earliest and most distinctive is dysuria, which should lead to a vaginal examination to confirm the diagnosis. In neglected cases, or where nature has not corrected the displacement spontaneously, *incarceration* occurs. The symptoms of this manifest themselves after the third month, and are: occlusion of the bowel and urethra, with their associated symptoms; congestion, inflammation and suppuration of the uterus, which may finally slough with the development of peritonitis and septic infection.

Terminations when Artificial Means are not Employed.—Spontaneous replacement (more likely in retroflexion than in retroversion); spontaneous abortion; incarceration; expulsion of the uterus from the body as a whole; rarely by sacculation of the uterus.

Prognosis.—Always satisfactory as regards maternal life when treatment is adopted early. When overlooked or neglected death frequently occurs. In fifty-one fatal cases the following, in order of frequency, were the causes of death: Uræmia and exhaustion; rupture of the bladder; septicæmia; peritonitis from inflammation of the bladder; pyæmia; rupture of the peritoneum and of the vagina; errors in treatment; gangrene of the colon.

Treatment.—Replacement. If undertaken early, manual means, pressing fundus in the direction of one or the other sacro-iliac joints, the patient in the lithotomy position. Failing, resort to knee-chest posture and a repositor to press upon the fundus.

The cervix should next be drawn downward with tenaculum, at the same time continuing the efforts to replace the fundus. If successful, a large-sized pessary or tampon should be applied until the growth of the organ maintains it in the abdominal cavity. When bound down by strong inflammatory bands, steady and long-continued pressure should be supplied by large tampons in the posterior vaginal vault. Failing, finally, abortion should be induced.

Treatment when Incarcerated.—Attempts at reposition as above. These unavailing, as is usual, induce abortion. If it is impossible to effect an entrance into the cervix for this purpose, it is justifiable to puncture the uterine wall through the vaginal vault, and thus draw off the liquor amnii. The organ may now respond to efforts at replacement, or permit the cervix to be drawn down and its canal dilated, to accomplish the evacuation of its contents. If the bladder is seriously distended, it should be emptied by the urethra, or supra-pubic puncture with an aspirating needle may be necessary. Be sure that the bladder is emptied, and not merely the lower segment, which is frequently shut off from the rest of the bladder by pressure of the cervix.

Should soft catheter fail, use metallic prostatic catheter. As a last resort, vaginal hysterectomy is justifiable.

(c) *Displacements to Either Side*.—Include latero-position, latero-version, latero-flexion. Latero-position is usually a congenital defect due to abnormally short broad ligaments, placing the whole uterine body more to one side of the abdominal cavity. Latero-flexion is also congenital, due to imperfect development of one side of the uterine body. Right latero-version is the rule during pregnancy. These malpositions complicate labor more than pregnancy (see Dystocia).

(d) *Prolapse*.—*Causes*.—Impregnation in an organ already prolapsed, or the consequence of retroversion, relaxed vaginal walls and outlet; the increased weight leads to prolapse in the first few weeks of pregnancy.

Terminations.—(1) Complete spontaneous reposition, which is most frequent. (2) Incomplete reposition, continuing in that state to full term. (3) Failure of retraction, inducing incarceration. (4) Failure of retraction, inducing abortion. Pregnancy will not continue to term in a completely prolapsed organ.

Treatment.—Reposition and application of some variety of ball pessary, retained by a firm T-bandage. When incarcerated, attempts at reposition should be cautious, but if they fail, owing to adhesions and œdema, abortion should be induced and the organ replaced.

(e) *The Pregnant Uterus forming a Part of a Hernial Protrusion*.—Occurs exceptionally, in inguinal and ventral, but never in crural hernia, the uterus getting into the sac before or after impregnation. The ventral variety is most frequent, and may occur between abnormally separated recti muscles, or, more rarely, is seen on the lateral aspect of the abdomen. When it occurs in the very exceptional inguinal variety, the pregnancy is apt to be in one horn of an abnormally developed uterus.

Treatment.—Attempts at reposition. These failing, entering the hand in the uterus, version and extraction are to be considered. The last resort is Cæsarean section or amputation of the pregnant uterus.

(f) *Torsion*.—Slight degree of torsion from left to right, physiological and constant. A more exaggerated degree may

be due to some abnormal condition, usually inflammatory, near the uterus, which results in twisting it upon its longitudinal axis. An ovary may thus be brought in front and be subjected to traumatism during manipulation of the abdomen.

2. DISEASE OF THE UTERINE MUSCLE. — (a) *Rheumatism*. The most common ; occurs in those of rheumatic diathesis.

Symptoms.—Great pain, localized in the uterine walls, lasting throughout the latter months of pregnancy, and increased periodically by the intermittent uterine contractions. The therapeutic test is, perhaps, the most valuable factor in the diagnosis.

Treatment.—Administration of salicylate of sodium.

(b) *Metritis*.—Is almost invariably acquired before impregnation, exercises a most deleterious influence upon gestation, and usually results in abortion.

Symptoms.—When pregnancy continues, there is great pain, a feeling of weight and heaviness, and usually distressing and obstinate vomiting, which, in some cases, may indicate the induction of abortion.

Treatment.—Glycerine tampons may be tried, although very likely to induce abortion.

(c) *New Growths*.—Complicate labor more than gestation.

1. Fibroids—are the most frequent, grow rapidly from increased blood supply to genitalia, and in exaggerated cases some operative interference is demanded. The same is true of other pelvic tumors to a less degree, as (2) ovarian cysts.

3. MALFORMATIONS OF THE UTERUS. — Complicate labor more than gestation (see *Dystocia*).

4. DISEASES OF THE CERVIX.—The same may be said of these, except bad cases of laceration with eversion and carcinoma, which very frequently induce abortion or premature labor. Minor complications may arise from inflammatory processes within the cervical canal, giving rise to mucous or even bloody discharges. Supposed menstruation persisting throughout pregnancy is probably thus accounted for.

5. DISEASES OF THE VAGINA. — Due to increased blood supply or specific infection. (a) *Leucorrhœa*; feeling of heat and discomfort. (b) *Specific infection*. Affects rather the new-

born infant and mother soon after delivery. Requires energetic treatment to eliminate such complications. Bichloride douche, 1 to 2000 b. d., and a tampon dusted with tannic acid. A study of vaginal secretions during pregnancy (Döderlein) has thrown additional light on the question of septic infection after labor. In the normal secretions, especially of virgins, there is a large non-pathogenic bacillus which seems to have a destructive action upon other micro-organisms, by producing an intensely acid environment (probably due to lactic acid). In pathological secretions the reaction is weakly acid, neutral, or alkaline; there is also an increased amount of mucus, bubbles of gas, epithelial cells, and a large number of mixed micro-organisms. Out of 195 pregnant women examined, 44.6 per cent. had pathological secretions. Whenever the secretion was pathological, the large bacilli were absent. Of cases with pathological secretions, only 10 per cent. had streptococci. These remain in the vagina unless they are carried into cervix and uterus by examining finger or instruments. (c) *Hemorrhoids*. Guard the part from traumatism, which can produce alarming hemorrhage. (d) *Colpohyperplasia cystica*. (e) *Polypoid hypertrophies of the vaginal mucous membrane*.

6. DISEASES OF THE VULVA.—Also largely due to increased blood-supply. (a) *Hemorrhoids*. (b) *Vegetations*. Require no treatment beyond protection. (c) *Pruritus vulvæ*. May be a neurosis or due to the vaginal and cervical discharges. Is oftentimes intractable. Treatment belongs to Gynæcology. (d) *Œdema*. May be unilateral or bilateral, and in some cases extreme in degree. Usually associated with other dropsies in kidney insufficiency. May be due to pressure or in unilateral form to labial abscess. Treatment: Hot fomentations and possibly puncture. Relief of cause if possible.

7. BLEEDING FROM THE GENITALIA DURING PREGNANCY.—*Causes*. (1) *Separation of the Placenta*, prævia or normally situated, and in early pregnancy *separation of the membranes* (threatened abortion).

(2) *Persistence of Menstruation*.—Recognized by its periodicity.

(3) *Cervical Endometritis*.—Hemorrhage is slight.

(4) *Intracervical Polyp*.—The loss of blood progressively in-

creases in amount as a result of the rapid growth of the polyp during pregnancy.

(5) *Malignant Tumor of Cervix.*

(6) *Malignant Tumor of Vagina.*—Both are recognized by the history of previous disease, the occurrence of bleeding when anything comes in contact with the diseased surface, as after coitus, and by digital and speculum examination.

(7) *Hemorrhoids.*—About meatus, vulva, or in vaginal walls.

(8) *Apoplexy of Placenta.*

8. PERIUTERINE INFLAMMATIONS AND ADHESIONS.—Old cases may be benefited by massage. Appropriate treatment during the intervals between pregnancies is required. Fresh attacks of periuterine inflammation in pregnancy, depending upon oöphoritis and pyosalpingitis, are exceedingly dangerous. A woman *may* be impregnated though she have at conception a pyosalpinx and densely adherent tubes and ovaries.

9. LOOSENING OF PELVIC JOINTS.—When pronounced, interferes with locomotion. The diagnosis is made by a vaginal examination, the patient in the erect posture taking a few steps. Treatment: Application of a firm binder about hips and pelvis, or rest in bed if exaggerated.

10. BREASTS.—(a) *Mammary Abscess.* Its cause, course, and treatment same as when it occurs during the puerperium. (b) *Eczema of the Nipples.* Is very obstinate and resists treatment. Relief only occurs after delivery.

II. Diseases of the Alimentary Canal.

1. MOUTH.—(a) *Caries of the Teeth.* Is of rather common occurrence, particularly in the upper classes. As a rule, it is best not to advise interference, as dental operations might provoke abortion.

(b) *Gingivitis.*—Gums spongy, inflamed, bleed easily, possibly ulcerated. Obstinate, resists treatment until pregnancy is concluded. Occasionally the gingivitis extends to a stomatitis, and rarely lasts through, and is aggravated by lactation, only disappearing when the child is weaned.

(c) *Toothache.*—Develops with or without other pathological

changes in the mouth, and resists treatment. Usually subsides when pregnancy has advanced beyond the first half of gestation.

(d) *Ptyalism*.—Cause not known. Astringents, belladonna, chloral, etc. may be employed. Disappears usually in the latter months. May recur in each succeeding pregnancy.

2. *STOMACH*.—There is a physiological, an exaggerated, and a pernicious vomiting in pregnancy. The last is a serious disease.

Pernicious Vomiting.—*Causes*.—(1) Reflexly, from irritation of the uterus and its contained nerve-endings by the stretching of the uterine walls. It is thus more common in primiparæ, in twin pregnancy, when chronic metritis or displacement of the uterus exists, and when the nervous system is hyperæsthetic or disarranged. (2) Inflammation of the lining membrane of cervix or uterus. (3) Engorgement of neighboring organs, as inflamed tubes or ovaries. (4) Some pathological condition of the stomach, as chronic gastritis, gastric ulcer, etc., pregnancy increasing the irritability already present. (5) Rarely some pathological condition of the intestinal tract, as polyps, bands of adhesions. (6) Increased indulgence in sexual intercourse. The last is a not infrequent cause. (7) Kidney insufficiency is an important cause, very often operative, when the vomiting recurs late in pregnancy.

Diagnosis.—Of the cause is difficult; of the condition easy. There are perhaps fever, great emaciation, and loss of strength, which may prove fatal. The worse cases occur between the second and fourth months. Mistakes are sometimes made by overlooking the existence of pregnancy.

Treatment.—Remove the cause, if ascertainable.

(a) *Hygienic*.—Includes regulation of the diet, attention to gastro-intestinal tract, etc. Advise a light breakfast of tea and bread or milk, taken in bed before getting up, the patient lying flat upon her back. Sexual intercourse should be restrained. Oftentimes there is improvement when the sensation of swallowing is removed by a cocaine spray or œsophageal tube. Rectal alimentation in extreme cases, the enemata being non-irritating, so as not to provoke an exhausting diarrhœa. Four to six ounces may be given three or four times a day, predigested. Liquid peptonoids, pancreatized meat or milk. The “rest

cure," combined with other treatment, has proved efficient in some cases. Some tolerance of the stomach may at times be established by allowing apparently unsuitable articles of food when specially desired by the patient.

(b) *Medicinal*.—The drugs that have been used are innumerable. Of these may be mentioned iodine, grtt. j–ij in water; oxalate of cerium, subnitrate of bismuth, tinct. nux vomica, antipyrin, wine of ipecac., menthol, hydrobromate of hyoscin. Nervous sedatives, as bromides, chloral, and opium, are the most reliable. Sodium bromide, gr. x, in aq. camph., ℥iv, four times a day. If necessary, resort to enemata of sodium or potassium bromide, gr. xl, and chloral, gr. xx, two or three times a day, dissolved in water.

(c) *Gynecological*.—Replace a displaced uterus. If the cervix or canal is inflamed, apply with a cylindrical speculum a 20-gr. solution of nitrate of silver. Peroxide of hydrogen has been similarly used. If applications to the canal are made with an applicator, abortion may result. When due to metritis, treatment does not accomplish much at this time. Glycerine tampons may be used after simpler plans fail, as they may induce abortion. Empirically, a 15 per cent. solution of cocaine may be applied to cervix and vaginal vault, and, similarly, dilatation of the cervix with the fingers has been successful in certain cases.

(d) *Obstetrical*.—Induction of abortion or premature labor should be done as the last resort, and yet not too late.

The mortality of the pernicious vomiting of pregnancy is high; of 239 cases, 95 died; of 57 cases treated by the usual means, 28 died; of 36 cases treated by the induction of abortion, 9 died.

3. **INTESTINES**.—(a) *Constipation*.—Should be guarded against to prevent overwork of the kidneys. Cascara sagrada, the weaker mineral waters, and pulv. glycyrrhizæ comp. may be used. Active purges may interrupt the course of gestation.

(b) *Diarrhœa*.—When the ordinary remedies fail, nerve sedatives may control it, as it is sometimes explained by intestinal irritability, resulting from pressure of the gravid womb.

(c) *Gastric and Intestinal Indigestion*.—The latter is quite common in primiparæ, and gives rise to severe abdominal pains.

4. **LIVER**.—Jaundice may result from a mild catarrhal condi-

tion of the bile-ducts, which may have existed before pregnancy. This class of cases is of little clinical importance. It should be remembered that a serious condition may develop as the result of excessive work thrown upon the liver—namely, an acute degeneration of the whole hepatic structure. Another explanation is that poisons (such as may produce eclampsia) circulating in the blood act upon the liver, producing acute yellow atrophy.

Treatment.—The simple catarrhal jaundice is treated by regulation of diet and bowels, and securing a free discharge of bile.

The graver form is rapidly fatal.

5. HEMORRHOIDS.—Guard against constipation. Astringent applications may be made. Operative interference is likely to interrupt pregnancy.

III. Diseases of the Urinary Apparatus.

1. KIDNEYS.

(a) *Kidney of Pregnancy.*—*Pathology.*—Anæmia, with fatty infiltration of the epithelial cells, and without any acute or chronic inflammation.

Cause.—Obscure. Has been attributed to pressure on the bloodvessels; to the compression by the gravid uterus; serous condition of the blood in pregnancy; influence of the weather, and to spasmodic contraction of the renal arteries. It is most probably due to a diminution of the blood supply.

Symptoms.—Albuminuria. Hyaline and granular casts, with epithelium filled with fat, may be found.

Frequency and Course.—About six per cent. of all pregnant women have albumin in the urine. Occurs most frequently in primiparæ; runs a subacute course, manifesting itself most plainly in the latter months of gestation, and can influence the general health, course of pregnancy, and occurrence of eclampsia, the same as inflammatory renal diseases. Upon the fœtus, also, it exerts practically the same influence in the production of placental apoplexies. The dangers are greatest when the condition develops suddenly. It disappears with the cessation of gestation.

Treatment.—Practically the same as for true nephritis.

(b) *Acute and Chronic Nephritis.*—These may occur at any time during pregnancy, with their usual symptoms. The extra amount of work thrown upon the kidneys at this time makes the prognosis more grave, and demands the most energetic treatment. Premature expulsion of the ovum and outbursts of eclampsia are frequent. The chronic variety is more frequently a complication, and may be acquired before or during pregnancy.

Differential Diagnosis.—If the kidney disease existed before pregnancy, marked symptoms will develop in the earlier months. If these develop in the later months, the disease has had its origin during pregnancy.

It is often difficult to distinguish between the following :—

Chronic Nephritis.

History may point to its existence before pregnancy.

Urine likely to be increased.

Presence of albuminuric retinitis.

Symptoms apt to be pronounced in earlier months.

Autopsy gives evidences of inflammatory changes.

Persists after delivery.

Casts early and in abundance.

Kidney of Pregnancy.

Kidneys normal at this time.

Urine likely to be increased.

Absence of same.

Same in latter months.

Anemia and fatty degeneration. No inflammatory changes.

Disappears after delivery.

Casts only in bad cases, not appearing until other symptoms have developed, and not in large numbers.

Treatment.—It is always of paramount importance to know in any case of pregnancy what the condition of the kidneys may be; hence in all cases the urine should be repeatedly examined, at least every ten days during the latter weeks. If the quantity of albumin is small, if there are no casts, no history of a previous nephritis, and no symptoms of general systemic disturbance, dietetic and hygienic management may be sufficient so long as the case is kept under careful observation. When considerable quantities of urine are voided or the amount is

seriously diminished, when casts and œdema are found, the patient should be put to bed for the greater part of the day, the bowels kept open, and milk diet and Basham's mixture given. Where an exclusive milk diet is impossible, milk soups, a slight amount of toast, the lighter vegetables—squash, asparagus, beets, salad, spinach, etc.—may be allowed in small quantities. Three grain doses of caffeine have given good results as a diuretic. Benzoic acid is also recommended. If, under this or any other more active eliminative plan of treatment, the symptoms grow progressively worse, induction of abortion or premature labor may be necessary. This should not be delayed too long. Serious eye symptoms always indicate it. Eclampsia can occur after the expulsion of the fœtus.

(c) *Renal Tumors*.—Rare. Are to be diagnosticated and treated according to the individual features of the case.

(d) *Dislocation of the Kidney*.—The right is almost always the one affected. Not infrequently associated with displacements of the gravid womb. Abortion may result if it happens to become twisted upon its pedicle, and from pressure the kidney of pregnancy may develop.

(e) *Diseases of the Pelvis of the Kidney*.—(1) *Pyelitis*. Premature expulsion of fœtus apt to occur. It is met with much more frequently after labor.

(2) *Hydronephrosis*. A displaced and adherent gravid uterus may occlude the ureters with this result. Requires reposition of the uterus.

(3) *Stone*. Apt to induce abortion. Renal colic is to be treated in the usual manner.

2. DISEASES OF THE BLADDER.

(a) *Irritability*.—Is functional, and occurs in hyperæsthetic individuals from pressure of the gravid womb.

Treatment.—Reposition of uterus if displaced. When neurotic, nerve sedatives are indicated.

(b) *Incontinence of Retention*.—Is the most common symptom of a backward displacement of the uterus.

(c) *Vesical Hemorrhoids*.—Due to increased blood supply and

pressure of womb. Hæmaturia may be a symptom. If extreme, astringents may be injected.

(d) *Cystitis*.—More frequent after labor; complicating pregnancy, it may be due to gonorrhœa.

(e) *Vesical Calculi*.—Important that they be discovered before labor, and removed through the urethra or by vaginal lithotomy.

(f) *Cystocele*.—Complicates labor.

(g) *Injuries, Tumors, Extrophy*.—Are very rare, and should be treated as their individual peculiarities may indicate.

3. ANOMALIES OF THE URINE.

(a) *Polyuria*.—An exaggeration of the physiological alteration.

(b) The urine may be diminished in quantity and more concentrated, as the result of errors in diet and inactivity of skin and bowels.

(c) *Lipuria*.—Explained by the unusual quantity of fat in the blood of some pregnant women. An oiled catheter may be the source.

(d) *Chyluria*.—Is of no pathological import.

(e) *Peptonuria*.—Occurs in pregnancy in consequence of fetal death or without ascertainable cause.

(f) *Hæmaturia*.—Produced by vesical hemorrhoids usually. It may be caused by tumors, stone, acute nephritis.

(g) *Glycosuria*.—Ranks next in importance to albuminuria. May be found in from sixteen to fifty per cent. of cases. Is said to be from absorption from the breasts, for the sugar is lactose and not glucose. Diabetes mellitus occurs more frequently in pregnant than in non-pregnant women, and when it exists before pregnancy, the latter condition increases its severity. In seven out of nineteen cases the disease determined fetal death, and in four out of fifteen cases the mother died shortly after labor.

(h) *Albuminuria*.—Found in six per cent. of pregnant women. Cause.—Kidney of pregnancy or nephritis.

IV. Diseases of the Nervous System.

1. BRAIN.

(a) *Inflammatory Diseases*.—Are accidental complications and rare; exert no special influence upon pregnancy, nor do they specially modify the course of gestation, except cerebro-spinal meningitis, which is infectious, and therefore has the same influence upon and is influenced in the same way by pregnancy as the other infectious fevers.

(b) *Anemia and Congestion*.—(See Eclampsia.) Apoplexy resulting from congestion has no influence upon the course of pregnancy or labor.

2. SPINAL CORD.

Inflammatory Diseases.—Also accidental and without influence upon pregnancy and labor.

3. PARALYSES.

Paraplegia may be present and yet pregnancy and labor be uncomplicated.

4. PERIPHERAL NERVES.

Obstinate neuralgias, which are little benefited by treatment, and disappear after labor. It should be remembered that localized pains of a neuralgic character, in the head, face, or breast, are a common symptom of advanced kidney disease in pregnancy. Multiple neuritis may be determined by pregnancy.

5. NEUROSES.

(a) *Chorea*.—Milder grades are not uncommon. Sixty per cent. of cases are in primiparæ. Heredity, chlorosis, rheumatism and the existence of the disease in the patient's childhood are predisposing causes. In the graver variety premature expulsion of the ovum is apt to occur, followed by death of the mother in about thirty-three per cent. of cases. Insanity often develops in these cases.

Treatment.—Fowler's solution, iron, and nutritious diet for the milder cases. The graver cases may require an anæsthetic, and

finally induction of premature labor, which is usually followed by spontaneous recovery.

(b) *Epilepsy*.—Comparatively rare. Usually does not influence unfavorably the course of gestation. Convulsions often absent during pregnancy, but make their appearance again during and after the puerperium. It is most likely to be confused with Eclampsia (see Eclampsia). The infant frequently dies after birth, presenting the symptoms of the maternal disease.

(c) *Hysteria*.—Occurs frequently in its minor grades, and, as a rule, does not exert an unfavorable influence.

(d) *Tetany*.—Pregnancy may determine an attack, usually of mild grade, ending in recovery, but possibly fatal from interference with respiration.

6. ORGANS OF SPECIAL SENSE.

(a) *Eyes*.—Failing vision should always indicate an examination for advanced kidney disease. Occasionally there occurs complete temporary blindness, associated only with anæmia of the eye-ground, due to reflex contraction of the retinal artery.

(b) *Hearing*.—Disturbances of this sense are rare, usually temporary, but may be permanent, and up to the present time are inexplicable. Some anomaly of the external auditory canal may be found, as a hæmatoma, which was the cause in one reported case.

7. PSYCHICAL ALTERATIONS.

Melancholia, mania, dementia.

Frequency.—Of all cases of insanity in women, about eight per cent. have their origin in child-bearing. About one in four hundred confined become insane.

Causes.—(a) *Predisposing*.—Strain of gestation in those predisposed by hereditary influence; temporary causes of mental disturbance; great reduction in physical strength.

(b) *Exciting*.—Exaggerated anæmia, as from prolonged lactation; septicæmia; albuminuria; profound emotions, as exaggerated fear of impending danger; dystocia, as hemorrhage after labor; great exhaustion, etc. Chorea results rather from the

same predisposing causes, and should not be considered an exciting cause.

Symptoms.—May be maniacal, melancholic or demented—*i. e.* exaggerated stupidity, lethargy, and mental confusion.

Time of Occurrence.—Most frequently during puerperium, next in lactation, and least during pregnancy. Mania is the most frequent form, melancholia next, dementia last.

Diagnosis.—Easy. Important to distinguish puerperal insanity from (1) the temporary delirium of labor, (2) delirium tremens, (3) the delirium of fever, especially septicæmia, and (4) preëxisting insanity.

Temporary Delirium of Labor.—Exceedingly common. Is usually momentary, and varies in degree from hilarity to exaggerated mania.

Delirium Tremens.—Labor, like an accident or surgical operation, can precipitate an attack in hard drinkers.

Delirium of Fever.—Most commonly due to septic infection. Oftentimes it is necessary to wait until the fever subsides to determine whether it be the cause of the mental symptoms.

Preëxisting Insanity.—Determined by the previous history.

Prognosis.—About two-thirds recover their reason in three to six months; of the other third, from two to ten per cent. die of septic infection or exhaustion; the rest remain permanently insane.

Treatment.—Modified rest cure, best carried out in an asylum, combined with administration of iron, arsenic, and nutritious diet, together with open air exercise and careful supervision to prevent any injury to themselves or attendants.

V. Diseases of the Circulatory Apparatus.

1. ENDOCARDIUM.

Valvular disease of the heart usually has its origin prior to pregnancy. It may originate from septic infection.

Prognosis.—Abortion is induced in about twenty-five per cent. of cases as the result of placental apoplexies, or stimulation of the uterus to contraction by the accumulation of CO_2 . Pregnancy also increases the danger of the heart lesion. In fifty-eight serious cases twenty-three died after premature delivery

of the child. In milder cases the prognosis is not so grave, yet the danger is increased. Complications to be dreaded during gestation are : (a) a fresh outbreak of endocarditis, (b) fatty degeneration of the papillary muscles, and especially (c) congestion of the lungs. If the disease be of long standing and advanced degree, about half the cases will die. If recent and limited, the symptoms may only be aggravated.

Treatment.—Same as under other circumstances. If maternal life is threatened, induce abortion or premature labor, guarding against a fatal result after the expulsion of the contents of the uterus by venesection should other organs become engorged, and by the application of pad and binder to prevent the ill effects of sudden diminution of intra-abdominal pressure.

2. HEART MUSCLE.

(a) Suppurative myocarditis, only seen in connection with septic infection ; (b) brown atrophy ; (c) fatty degeneration which may occur acutely in consequence of septic infection, or the accumulation of poisons in the blood when the kidneys are inactive.

3. GRAVES'S DISEASE AND GOITRE

Are unfavorably influenced by pregnancy. The former may have its origin in pregnancy. It predisposes to hemorrhages and fetal death. It may disappear after delivery. The latter may take on such an exaggerated development during pregnancy that asphyxia is threatened.

4. BLOODVESSELS.

The disease of most clinical interest is varicose veins, in rectum, anus, pelvis, bladder, external genitalia and lower extremities. In the last there may develop a pressure œdema.

Causes.—Changes in the investing muscular sheath of the veins, increased quantity of blood, and mechanical disturbances by the growing uterus. Atheroma and degenerative changes may be found in the vessels as the result of kidney insufficiency.

Complications.—Rupture with possibly fatal hemorrhage, or extensive extravasation of blood under the skin. Thromboses and phlebitis with suppuration and septic infection may occur.

As the result of itching and scratching eczema or even erysipelas may develop.

Treatment.—Elastic bandage or stocking when in the legs. Small doses of heart tonics may be given and constipation avoided. Absolute rest in cases of thromboses, to prevent embolism. Lead-water and laudanum when there is any inflammation. Abscesses should be opened. A mechanical protection should be applied to affected part to prevent the development of eczema or erysipelas, and itching may be relieved by weak solutions of carbolic acid or cocaine.

5. BLOOD.

Pregnancy very often has a direct influence in producing those blood diseases which are characterized by a marked alteration in its constituent parts. Pernicious anæmia and leucocythæmia can have their origin in gestation, and should they already exist their prognosis is rendered more serious. Pregnancy may be interrupted by the existence of these blood diseases. The anæmia of pregnancy may be so exaggerated as to simulate these, yet arsenic, iron, and nutritious diet after delivery will usually effect a cure. *Purpura hæmorrhagica* is apt to be rapidly fatal in pregnancy, which it always interrupts. Usually destroys the fœtus. Death may be due to post-partum hæmorrhage or to sepsis.

VI. Diseases of the Respiratory Apparatus.

1. NOSE.

The sense of smell is more acute, and peculiarities in this sense are developed, as abhorrence for certain odors, which may excite nausea and vomiting in neurotic individuals.

More important is the disposition to epistaxis, which may be so severe as to threaten life. More frequently, however, this complication occurs during labor. It can only be relieved by the rapid termination of labor.

2. LARYNX.

If a tumor, tubercular or syphilitic disease be present, there

is a constant danger of œdema of the glottis, which will require tracheotomy.

3. BRONCHI AND LUNGS.

(a) *Bronchial Catarrh* ordinarily is not harmful, but constant coughing can cause abortion, and the hydræmic condition of the blood predisposes to pulmonary œdema.

(b) *Pneumonia*.—Symptoms are much aggravated, mortality increased, and in the vast majority of cases the fœtus is expelled prematurely. (See Pathology of Puerperium.)

(c) *Emphysema*.—Quite common. Symptoms aggravated and abortion apt to occur. Inhalations of oxygen may be given to counteract the accumulation of CO_2 .

(d) *Asthma Gravidarum*.—May only appear in pregnancy, and disappear the moment it is terminated. May only appear in labor. The attacks may be much aggravated by gestation and obstinately resist treatment.

(e) *Phthisis*.—The influence of pregnancy upon this disease is most unfavorable, and in those predisposed gestation may be the determining factor which brings on an attack.

(f) *Miliary Tuberculosis* is rapidly fatal and may be mistaken for septic infection.

(g) *Pulmonary Embolism* is a possible accident.

(h) *Pleurisy*.—Exerts no deleterious influence upon, nor is it affected by, pregnancy.

(i) *Hæmoptysis*.—May occur in latter months of pregnancy without phthisis or other lung disease. Often the result of "cardiac nerve-storms" in pregnant women.

VII. Diseases of the Osseous System.

Osteomalacia, a decalcification of the bones due to a peculiar osteitis and periostitis. *Pott's disease*, in its active stage, is aggravated by pregnancy, and the mortality is much increased.

VIII. Infectious Fevers

are always more serious when complicating pregnancy, their symptoms being more severe and mortality greater. Even *measles* at this time may become a deadly disorder.

Upon pregnancy their influence is, as a rule, unfavorable.

Sixty-five per cent. of *typhoid* cases are complicated by abortion. The infants may be idiotic if they go to term.

Syphilis rather exerts its influence upon the fœtus. If the mother is diseased before impregnation, the fœtus and appendages exhibit characteristic pathological alterations. If the mother acquires the disease from the fœtus, she may exhibit all the secondary signs without the appearance of a primary lesion. If she be infected during gestation, as a rule, the mother is affected, the fœtus escaping, although the latter is not so absolutely exempt from infection as at one time claimed. Should infection occur at the time of impregnation the primary sore may become almost malignant, ulcerate into the vagina, resist treatment, and complicate the puerperal state.

Treatment.—All the infectious diseases are to be managed with little reference to pregnancy. If abortion is threatened, it should not be combated, as it is an effort on the part of nature to improve the maternal condition.

IX. Skin Diseases.

The following have their origin in pregnancy :—

1. IMPETIGO HERPETIFORMIS.

The favorite seat of the eruption is in the groin, around the umbilicus, on the breasts, in the axilla. The small pustules become crusts, around which new pustules develop until the entire surface of the skin in the course of three or four months becomes covered. Rigors, high intermittent fever, great prostration, delirium, and vomiting accompany the eruption.

The disease appears, as a rule, during the second half of gestation. Modern observation has shown that it is not absolutely confined to pregnancy. Of twelve cases ten terminated fatally, but they exercised no influence upon the course of gestation.

2. HERPES GESTATIONIS

Is characterized by a pemphigoid efflorescence, exhibiting erythema, papules, vesicles, and bullæ. It appears early in pregnancy, continues during gestation, and disappears during the

puerperal state. Neurotic symptoms are associated with it, showing its probable nervous origin.

3. PRURITUS.

Its usual seat is the external genitalia. It may be general. *Causes.*—Neurosis ; irritating discharges ; parasites. Rarely in the general variety it may be necessary to induce premature labor.

4. EXAGGERATED PIGMENTATION.

Spots of pigmentation may appear on breasts, thighs, and abdomen as large as ten cent pieces or a quarter. The chloasmata on the face may be exaggerated.

X. Injuries and Accidents.

Severe injuries usually result in abortion. The most serious accidents of pregnancy are those which cause *rupture* of some of the *large bloodvessels* of the external genitalia or lower extremities. One of the rarest accidents is spontaneous rupture of the uterus. It may occur in consequence of a previous Cesarean section ; chronic inflammation and degeneration of the uterine walls, reducing them to little more than connective tissue ; traumatism ; a former rupture of the uterus which has healed, but left a weak spot in the uterine wall, closed by cicatricial tissue. Spontaneous rupture of the uterus in pregnancy almost always occurs at the fundus, and frequently at the placental site. A very serious accident of pregnancy is detachment of a normally situated placenta with internal hemorrhage. (See page 202.)

XI. Surgical Operations.

When life or health is seriously threatened by delay until recovery from the puerperal state, surgical operations upon pregnant women are justifiable, and permission may be given for their performance without very great fear of inducing thereby an abortion if septic infection is avoided. Upon nervous and irritable women, however, slight operations may induce abortion.

XII. Abortion, Miscarriage, and Premature Labor.

ABORTION.—Expulsion of ovum before the fourth month.

MISCARRIAGE.—Expulsion from the fourth to the sixth month.

PREMATURE LABOR.—Delivery of a fœtus that has become viable.

Frequency.—Correct estimate difficult. One to four or five pregnancies.

Causes.—(1) Death of the fœtus; (2) abnormalities and diseases of the membranes, including the deciduæ; (3) pathological conditions of the placenta and apoplexies of the ovum; (4) traumatism; (5) certain diseases of the mother directly affecting the product of conception (see Diseases of the Membranes and Fœtus); (6) conditions of the mother causing contraction of the uterine muscle and premature expulsion of the normal ovum.

The last cause includes the following:—

(a) *Irritable Uterus.*—The expulsion, in such cases, results from a trivial cause, as a long walk, purgatives, jolting, congestion of the pelvic organs, chronic constipation, reflex irritation as from suckling, extraction of a tooth, pruritus, ovarian disease, sea-bathing. Even the sight of another woman in labor has been known to cause abortion. At the menstrual epoch these causes are most liable to produce abortion.

(b) *Spasmodic muscular action in the mother.*

1. *Chorea.*—Less than half the cases go to term. The premature expulsion of the ovum explained by physical exhaustion, blood stasis, and excess of CO_2 in the uterine muscle stimulating to contraction or by choreic movements of the uterus. 2. *Eclampsia.* More than one-half the cases abort as the result of asphyxia of the uterus, accumulation of urea, carbonate of ammonium or ptomaines, or due to the convulsive action being shared by the uterus. 3. *Uncontrollable vomiting and coughing.* Of 51 cases 20 were delivered before term. 4. *Epileptic, hysterical, cholæmic, and tetanoid convulsions.*

(c) *Conditions of the maternal blood which stimulate the uterus to expulsive efforts.*

1. *Poisons of all the infectious fevers.* It is yet undecided

whether the abortion is due to irritative action of micro-organisms, leucomaines, or to a diminution of the oxygenating power of the blood. 2. *Accumulation of CO₂*. When there is an accumulation of CO₂, as in pneumonia, heart disease, emphysema, etc., inhalation of oxygen may be given with some hope of success. 3. *Fever*.

(d) *Local conditions*.

1. *Tubal or ovarian disease, with perimetritis and adhesions, or other inflammatory diseases in the neighborhood of the uterus, as appendicitis*. 2. *Fibroids, polyps*. 3. *Uterine displacements*. 4. *Lacerations of the cervix in irritable uteri*. 5. *Over-distention from hydramnion or multiple pregnancy*.

(e) *Placenta prævia, obesity, contagious abortion*. These are rare causes, and the last are really cases of septic infection.

Many of these causes may be operative in a number of successive pregnancies, producing the so-called "habitual abortions."

Clinical Phenomena.—1. Hemorrhage. 2. Pain. 3. Expulsion of some portion of the ovum. All three are rarely typically manifested in every case. Their duration varies from almost instantaneously to days or weeks. In early abortions hemorrhage is more pronounced than pain, and the blood is extruded in coagula. The appearance of the substance expelled varies with the period of pregnancy and entirety of the product of conception. The chorionic coat may be entire, the deciduæ may surround the embryo, or it may be surrounded by the amnion. Most frequently the decidua vera remains behind, and hence the danger of sepsis.

Mortality.—In 1012 cases there were 14 deaths, a mortality of 1.38 per cent. Of 116 criminal abortions 60 died.

Diagnosis.—(a) *Threatened abortion*. Hemorrhage, and more or less pain in a patient with signs of early pregnancy.

(b) *Inevitable abortion*. Persistent hemorrhage; dilatation of os; ovum presenting; considerable pain; portions of ovum expelled; effacement of the angle between the upper and lower uterine segment (Tarnier). Exceptionally one or more of these may be present and the case go to term.

(c) *Incomplete abortion*. Examination of fragments discharged by floating them in water. Digital examination will usually find

the os patulous, and detect shreds of deciduæ, the placenta or foetal membranes in the uterine cavity.

(d) *Complete abortion.* Uterus is firmly contracted ; os retracted and digital examination of the uterine cavity difficult or impossible. The diagnosis must depend upon the history ; the examination of the discharge ; the enlarged uterus ; lochial discharge, and possibly the establishment of milk secretion, which is more marked the later the date of pregnancy. Finally, the disappearance of the presumptive signs of pregnancy which had previously existed.

Diagnosis of Miscarriage.—Escape of liquor amnii indicates rupture of the membranes. As the result of the death of the foetus, there is a cessation of foetal movements and growth of the uterus, a disappearance of the reflex and psychological disturbances characteristic of pregnancy, and possibly the appearance of the milk secretion. The pain is greater than in abortion and is more like labor pain. At this stage of pregnancy the placenta is intimately adherent to the uterine wall, and often fails to become detached. For this reason the hemorrhage is apt to be serious and the danger of sepsis great.

Prognosis of Abortion and Miscarriage.—The ovum is inevitably destroyed. The dangers to the woman are hemorrhage, particularly its secondary effects, and sepsis. Retained fragments may develop into polypi.

Treatment.—(a) *Preventive.* Includes the treatment of the causes that may exist in any given case. Enjoin rest at menstrual epoch, and restrain sexual intercourse where there is an irritable uterus. Replace a displaced uterus ; before impregnation repair a lacerated cervix ; treat any inflammatory condition about the uterus. If it be due to any of the general diseases, do not attempt to prevent the occurrence of the abortion.

(b) *Threatened Abortion.* Absolute rest in bed. Drugs to diminish nervous sensibility and muscular action, as opium, potassium bromide, chloral. Opium should be given in full doses by the mouth, hypodermatically, or by the rectum. The fluid extract of viburnum prunifolium in drachm doses is very efficient. It may be combined with opium, administering the latter by suppository.

(c) Inevitable Abortion. If the hemorrhage is profuse before dilatation of the os occurs, control the bleeding by vaginal tampons of antiseptic wool or baked cotton. Remove in eight hours and reapply if required. Often when the first one is removed, the ovum or fœtus may be found extruded, when the urgent symptoms may subside. Intrauterine tampons of little balls of iodoform cotton or strips of iodoform gauze may be used if required. Deciduous membrane in the earlier months, the placenta in the later, are apt to remain behind. The best method to employ for their removal is a disputed question. The *expectant plan* combines the use of ergot, tampon, and great care to avoid rupturing the membranes. If the abortion be incomplete, rest in bed, small doses of ergot, vaginal, and, if possible, intrauterine, antiseptic douches. At the first indication of sepsis, or if hemorrhage persists after the expulsion of a part of the ovum, the uterine cavity should be cleared out.

The *active treatment*, which is the better plan, is the use of the tampon to control bleeding, and as soon as the os is sufficiently dilated, the removal of the uterine contents by one of the following methods: The finger; the *curette* in experienced hands; the method of expression (Hoening); the placental forceps; after which an intrauterine douche of a two per cent. solution of creolin should be given. If needed, Hegar's dilators may be used to stretch a retracted os.

After-Treatment.—Very little required after active treatment beyond confinement to bed until involution is complete. When the expectant plan has been followed, antiseptic douches are to be used, and the earliest sign of sepsis looked for.

XIII. Missed Abortion.

By this term is meant the death of the embryo, threatened abortion, the subsidence of symptoms and the retention of the ovum for a varying length of time—occasionally very great—in utero.

XIV. Extrauterine Pregnancy.

Frequency.—The exact proportion to intrauterine gestations is difficult to determine. It is said to be about 1-500. In the

larger cities a large number occur annually. Many cases are never diagnosticated.

Classification based upon the Situation of the Developing Ovum.—

1. Tubal.

(a) Tubo-uterine or interstitial.

(b) Tubal proper.

(c) Tubo-ovarian.

2. Ovarian.

3. Abdominal.

Secondary abdominal.

(a) Tubo-abdominal.

(b) Utero-abdominal.

Cause.—Obscure. Any disease of the mucous membrane of the tube depriving it of cilia, forming mucous polyps or otherwise obstructing its calibre, predisposes to its occurrence. Peritoneal adhesions constricting or distorting the tube and congenital narrowness of the tubes are also causes. A diverticulum in the tube and an accessory tubal canal have been noted.

Clinical History.—In each of the situations noted above, the course of gestation is somewhat different, and presents a different clinical picture on account of the difference in the surrounding anatomical structures which are involved. The general presumptive signs of pregnancy are usually the same as in intrauterine gestation, but there is apt to be considerable pain. Occurs oftenest between 20th and 30th year. Youngest woman, 14; oldest, 47.

Changes in Uterus and Vagina.—In all forms these changes are rather constant. Most of the alterations characteristic of intrauterine pregnancy are found, *i. e.*, hypertrophy of the vaginal mucous membrane, with increased blood supply (purple tinge) and increased secretion; cervix softened and os patulous; uterus enlarged, and, in the vast majority of cases, deciduous membrane developed, which undergoes the same change as in intrauterine gestation preparatory to its separation and extrusion, which occurs in extrauterine gestation between the eighth and twelfth week, as a complete cast of the uterus and even of the tubes or in shreds. The common

course is absence of menstruation until the death of the embryo or rupture of the sac when the menses return with discharge of decidua and metrorrhagia may continue for a long time.

The other changes in the maternal organism vary with the situation of the developing ovule.

Clinical History of Tubal Pregnancy.—Usually the woman has had children, but a long interval has elapsed since the birth of the last child. The most frequent situation of an extrauterine gestation is about the median portion or outer third of the tube. In this position it may grow upward into the abdominal cavity distending the tube walls to the point of rupture, or it may grow downward between the layers of the broad ligament, and then backward and upward behind the posterior parietal layer of the peritoneum. The tubal walls grow thicker from the development of their muscle fibres, except at spots, especially on upper and posterior surfaces, where rupture may occur, the individual, perhaps, experiencing severe cramp-like pain, followed by symptoms of profound shock and death in a few hours. Fever is often seen, sometimes to a high degree, even before rupture occurs. Exceptionally, the gestation may proceed to full term, which is more common when the ovule has at first grown downward. When rupture occurs it usually takes place between the eighth and twelfth week, but may be seen as early as the 30th day or after the sixth month. If upon the upper or posterior aspect of the sac, the contents are extruded into the peritoneal cavity with an intraperitoneal hemorrhage. If rupture occurs on the lower aspect, the contents and hemorrhage find their way between the layers of the broad ligament and pelvic fascia, giving rise to an extra-peritoneal hæmatocele. The first variety is usually fatal; the last is not always directly dangerous to life. But the layers of the broad ligament may rupture when distended with blood, and the bleeding then becomes intraperitoneal and unlimited. The bleeding may also be limited by peritoneal adhesions shutting off the peritoneal cavity and forming a closed sac in the iliac region. From adhesions to intestines complications, such as perforation and obstruction of the bowel may occur. There may be

multiple (twin) extrauterine gestation; coincident intra- and extrauterine pregnancy and pregnancy first in one tube and then in the other.

Clinical History of Interstitial Pregnancy.—The ovule develops in the uterine wall, the inner side of the sac often projecting into the uterine cavity, and having on the outer side the round ligament and a greater part of the tube. The usual termination is rupture into the peritoneal cavity. Rupture into the uterine cavity and expulsion of the ovum through the cervix are possible.

Clinical History of Tubo-ovarian Pregnancy.—The ovum develops between the fimbriæ of tube and ovary. The sac may rupture with the usual consequences of such accident. It is possible, however, to see a development of the ovule to maturity. The ovule may lodge upon the ovarian fimbria and thence grow between the layers of the broad ligament.

Clinical History of Ovarian Pregnancy.—The ovule, impregnated while it is still within the Graafian follicle, reaches some degree of growth and development in this situation. Is exceedingly rare. A few undoubted cases on record. One case in Philadelphia went to term.

Clinical History of Abdominal Pregnancy.—Also rare. Several authenticated cases. Is likely to go to full period of gestation and mature development of fœtus. In this and the preceding variety there is a sort of decidua formed from which the chorion and placenta draw nutriment. In abdominal and advanced tubal gestation the liquor amnii is absorbed after the death of the fœtus. The abdomen is consequently reduced in size and the tumor is changed in consistency.

Clinical History of Utero-abdominal Pregnancy.—Very rare. The pregnancy is at first intrauterine, but the ovum escapes into the abdominal cavity through an opening in the uterine wall, retaining some connection by the placenta, with the uterine cavity. The process of extrusion must be gradual. These cases follow either the Cæsarean section or rupture of the uterus at a previous labor. The fœtus may advance to term.

TERMINATIONS OF EXTRAUTERINE PREGNANCY.

(a) *Death and absorption of early embryo with absorption of liquor amnii, atrophy and disappearance of gestation cyst.*

(b) *Rupture of the Sac and Profuse Hemorrhage.*—Occurs most commonly in the tubal variety, where the growth is upward toward abdominal cavity. May occur when the ovule grows down between layers of broad ligament; also in tubo-uterine, tubo-ovarian, ovarian and abdominal. Up to second month the extruded embryo may be absorbed. The hemorrhage may be fatal in a short time, two hours; usually takes from 8 to 16 hours for the woman to bleed to death, and maybe longer. The hemorrhage may be fatal as late as the second, third, or fourth day, or there may be successive hemorrhages, perhaps days apart, until the patient is gradually exhausted or is suddenly destroyed by an unusually profuse outpour of blood. Surprisingly small tubal gestation sacs can on rupture give rise to fatal hemorrhage. The determining cause of rupture is not always apparent. It can occur while the patient is lying quietly in bed: but may follow the straining of defecation or urination, coitus, a gynæcological examination or an operation like curettement, or any sudden physical effort or mental excitement. Rupture of the sac or of a bloodvessel in its wall, with profuse hemorrhage, has occurred long after the destruction of the embryo and cessation of growth in the sac (two years in one case).

(c) *Rupture of sac with extrusion of contents, and interstitial hemorrhage into sac walls without escape of blood into peritoneal cavity or between layers of broad ligament.*—This is followed by atrophy of ovum and sac.

(d) *Death of the Fetus after third month.*—Occurs most often in abdominal or tubo-ovarian, though possible in pure tubal. 1. The fetus may be converted into a lithopædion or be mummified, and in these conditions removed by operation through abdomen, vaginal vault, or possibly the rectum. 2. The soft parts may macerate, leaving the bones, which may remain as an abdominal tumor or ulcerate into bladder, intestines or through anterior abdominal wall. 3. The fetal body may pu-

trefy from contiguity of the intestines and their contained micro-organisms and access of germs. Or from the same cause the sac is converted into an abscess.

(c) *Termination of Ovarian Pregnancy*.—Arrest of development of the ovum at an early period occurred in one case, and the small cystic tumor containing the fetal bones was retained. In another the fœtus went on to full development, died, and was removed at least one year later. Rupture of the sac and profuse hemorrhage may occur.

(f) In *tubo-uterine*, the ovum and embryo may be discharged into the uterine cavity and evacuated by the natural passages. Two authenticated cases. Rupture and hemorrhage into peritoneal cavity are more usual.

(g) In cases of so-called *tubal abortion* there is an internal rupture of the ovum, and blood is poured through the fimbriated extremity of the tube into the abdominal cavity.

(h) It is asserted that a tubal pregnancy may rupture in its early stages, the embryo be expelled into the abdominal cavity, retaining its connection with the tube by the cord and placenta, and the fœtus continue to full development. This is called a *secondary abdominal pregnancy*. Rupture in these cases has probably not occurred, and the sac wall carefully examined would probably show enormous dilatation of the tubal wall.

(i) *Growth and development of the placenta after foetal death*.—This has been asserted, but does not occur.

(j) *Profuse Hemorrhage into gestation sac, forming a large hæmatoma*.

(k) *Hæmatoceles and Hæmatomata in the abdomen, pelvis and pelvic connective tissue* in a third or more of the cases are due to the hemorrhage from a ruptured gestation sac. The blood may collect in front of the uterus (anteuterine hæmatocèle), more commonly behind the uterus (retrouterine hæmatocèle); may be encapsulated in the neighborhood of either broad ligament or may be contained in the pelvic connective tissue on either side of the uterus. These collections of blood may suppurate and thus prove fatal. They can be evacuated through the abdomen or often through the vaginal vault. If not too large, they are absorbed.

Symptoms.—Uncertain. (a) Subjective. In the early months may be indistinguishable from those of intrauterine gestation. In the tubal variety, which is more common, there is often no indication of any abnormality until rupture occurs. In some cases this may be preceded by severe cramp-like pain in one or the other iliac region, accompanied or followed by the discharge of deciduous membrane. The temperature may at the same time be elevated and the general health much impaired. When advanced development occurs, as in abdominal and some cases of tubal, no symptoms may arise until the time for labor has passed, when pain and other complications may arise. There is usually cessation of menstruation for one or two periods; then a return in the shape of irregular bleedings which may last for months. In some cases irregular bleedings begin with conception and last till rupture—there is no cessation of menstruation. In others one period is slightly delayed; those after and before are normal. Again, the delayed period may be unnatural in character. In exceptional cases the menstruation occurs at the normal time, but is more profuse or scantier than normal.

Other symptoms noted have been: irritable bladder or dysuria; marked constipation or even obstruction if the tumor is on the left side; œdema of the corresponding limb and aching pain in it, especially at the groin; or numbness and even loss of power. Pulsating vessels may be felt in the vaginal vault.

(b) Objective. 1. Tubal. Tumor felt to one side of, behind, or possibly in front of the uterus, which is smaller than would be expected from the duration of the pregnancy. In advanced cases ballottement may be practised. The uterus is usually displaced forward, backward, or to the side opposite the tumor. If the discharged membrane can be obtained it will present characteristics of decidua in fragments or as a complete cast of the womb.

2. Interstitial. Diagnosis difficult or impossible. The uterus enlarges to a greater degree than in any other variety, and it may be impossible to determine whether or not it is symmetrically enlarged.

3. Abdominal. When the ovum occupies Douglas's pouch,

the foetal parts may be made out. A sacculated uterus may be mistaken for this.

Diagnosis.—In spite of a most careful history and physical examination, the diagnosis is occasionally impossible. Usually it is not made until rupture has occurred. At this time a history of early pregnancy, sudden collapse, and symptoms of internal hemorrhage, with abdominal distension and a vaginal examination showing effusion into peritoneal cavity, makes the diagnosis and indicates immediate laparotomy to prevent further hemorrhage and peritonitis. These symptoms have been pretty closely simulated by rupture of a varicose vein in the broad ligament and by rupture of an ovarian cyst or other pelvic tumor during pregnancy. But as all these conditions demand the same treatment a mistake in diagnosis between them is of no consequence. Should the cramp-like pain cause a patient to consult a physician, and should she give a clear history of impregnation—all the earlier signs of pregnancy, the discharge of blood and membrane which the microscope shows to be decidual, with the detection of a very sensitive tumor in the neighborhood of the uterus on which ballottement may perhaps be practised and the uterus not very much enlarged—the diagnosis is justified, and treatment also, even if it involve a serious operation. Among the conditions in the pelvis that may make the diagnosis impossible are abortion, in consequence of, or coincident with, some growth near the uterus; pyosalpinx, with an indistinct or untrustworthy history of pregnancy; intrauterine pregnancy, with rapid development of a fibroid on one side of the uterus; development of an impregnated ovule in one horn of a two-horned uterus or on one side of a double uterus.

Prognosis.—About two-thirds die; one third spontaneous cure. Treated by abdominal section the mortality is about 5 per cent. Of those that do not die directly in consequence of the tubal gestation a large proportion are invalids, and many die at a remote period from various complications, as bowel obstruction, ulceration, suppuration or hemorrhage.

Treatment.—Differs as it is met with in its early stage, or after rupture; whether interstitial, tubal, ovarian, or abdomi-

nal; whether the foetus has reached advanced development, as in abdominal; whether the conditions following foetal death require the treatment.

If the diagnosis has been made early, laparotomy and removal of the foetal sac. Electricity is an uncertain and unreliable remedy, and the cures ascribed to its use are most likely the result of nature's effort to effect a cure. Laparotomy is more trustworthy, and in these cases is almost always a difficult operation, not to be undertaken by an unskilled operator. In favorable cases, in which a trained nurse may be kept in constant attendance, and in which the physician can reach the patient quickly, it is justifiable to wait, after diagnosing extrauterine pregnancy, to see if the embryo does not die and the sac atrophy—quite a frequent occurrence.

After rupture the indication is for immediate laparotomy, evacuation of the blood from peritoneal cavity, ligature of the sac, and its entire removal. Rupture followed by hemorrhage is, however, not invariably fatal.

In *interstitial* little can be done until rupture and hemorrhage have occurred, when laparotomy may be performed, ligating the bleeding point, and, if possible, clearing the sac of its contents, along with the placenta. Where this is impossible, ligation of the uterine and ovarian arteries is indicated, or possibly supravaginal amputation of the uterus. It might be well, the diagnosis being established, to try to effect evacuation of the foetal sac into the uterine cavity after thorough dilatation of the cervical canal. A mistaken diagnosis, however, would lead to a premature termination of a normal intrauterine pregnancy.

Tubal and ovarian are to be treated as outlined above, when discussing the treatment of early extrauterine gestation and after rupture.

In advanced extrauterine pregnancy always delay until just before the natural duration of normal pregnancy, when the foetus and *foetal sac* should be extracted by abdominal section. Five such operations have been done, with five maternal recoveries. *When death of the foetus has occurred*, it is best not to subject the woman to the danger of the several possible terminations, but to perform laparotomy and remove the foetus and

its entire surrounding sac. If the exsection of the sac is found to be too difficult or dangerous, it is permissible, some weeks after foetal death, to cut off the cord short, leave behind the atrophied remains of the placenta, stitch the sac wall to the abdominal wall, and thus drain the sac externally. In case the gestation sac is low down in Douglas's pouch, bulging the posterior vaginal wall, vaginal section and the delivery of the foetus by the natural passage may be considered, but it is, as a rule, too dangerous, the mortality being about 50 per cent. It is applicable in case of an old gestation sac undergoing suppuration and containing a much macerated or disintegrated foetus.

XV Pregnancy in One Horn of a Uterus Bicornis or Unicornis.

Pregnancy in an ill-developed horn of the uterus may exactly resemble a tubal or interstitial pregnancy, and may end in rupture. This is particularly true if the impregnated ovule develops in a rudimentary horn, in which the conditions are almost the same as in a tube, except that rupture takes place later. On the other hand, a pregnancy of this sort may terminate prematurely, or even at term, by expulsion of the product of conception through the natural passage.

The diagnosis of pregnancy in a uterine horn is difficult or impossible. It is mistaken, usually, for tubal gestation.

Labor.

Physiology.

Labor occurs usually 280 days after the appearance of the last menstrual period.

CAUSES OF OCCURRENCE AT THIS TIME.

(a) *Periodicity.*--The muscular action at the periods is especially marked at the tenth.

(b) *Over-distention of Uterus, followed by Retraction.*

(c) *Maturity of Ovum* (fatty change of attachment).

(d) *Heredity, or Body Habit*, which is, perhaps, the most powerful. At this time slight causes, as exercise, purges, excitement, may begin the process.



SIGNS OF BEGINNING LABOR.

(a) *Subsidence of Uterus*.—This is a premonitory sign. Occurs about four weeks before term in primiparæ, two weeks or less in multiparæ.

Cause.—Over-distention of abdominal muscles. It may occur suddenly, and be followed by relief of pressure symptoms above, while those below may be increased, as excessive vaginal secretion, œdema, etc. If it does not occur, it indicates a malposition of the fetus, or some obstruction, as contracted pelvis.

(b) *Pains*.—Are colicky, intermittent; felt over the sacrum, or beginning in front and passing back to sacrum.

(c) *Blood-tinged Mucus*.—Due to expulsion of the mucous plug in cervix and torn cervical vessels.

(d) *Dilatation of Os*.—The most important. Rare exceptions should be noted in which the labor is arrested for days or weeks with the os dilated to an inch or more, and the membranes protruding into the vagina.

When the os is found dilated about one-half, labor is not infrequently terminated four to four and a half hours later.

CLINICAL SIGNS OF LABOR.

(a) *Contractions of Uterine Muscle*.—At each contraction the uterus drives the liquor amnii through the cervix, diminishes the area of intrauterine space, and produces an expansion of the birth canal. The contraction lasts about a minute, recurring at intervals of ten to fifteen minutes, which decrease as labor advances.

(b) *Behavior of the Patient*.—For about the first ten hours the sacral and abdominal pains are increasing in frequency and severity. During the second stage the voluntary muscles are brought into play, as shown by her straining and bearing-down efforts, the pains increase in frequency and strength, and there is a desire to empty bladder and rectum.

(c) *Phenomena of Birth of Head and Shoulders*.—The head retracts after each pain, and there is an intense pain and outcry as the head passes the perineum. Restitution is followed by birth of anterior shoulder.

A condition of contentment and happiness succeeds the

birth of the child until the uterine and abdominal contractions endeavor to separate and expel the placenta. These pains may be delayed beyond fifteen minutes in many cases.

Phenomena of Placental Separation and Expulsion.—The placenta is separated by a diminution of the placental area, and is expelled like an inverted umbrella.

The pouch-like dilated lower uterine segment often contains the placenta, hence artificial aid in its complete expulsion is often required.

A slight elevation of temperature is normal directly after labor.

Management of Labor.

Summons to an obstetric case should receive immediate attention.

(a) *Armamentarium.*—Ether, brandy, vinegar, a large new sponge, pads, clothing for mother and child, fountain syringe, should be provided before confinement. The obstetric bag should contain: soap, nail-brush, tablets of bichloride, 5 per cent. carbolyzed vaseline, iodoform tape or antiseptic Chinese silk, pocket-case with sutures and needles, needle-holder, ergot, hypodermic syringe, iodoform gauze, absorbent cotton, forceps; a small faradic battery is desirable.

(b) *The Examination.*—Abdominal palpation and auscultation should determine the position and presentation; touch should ascertain the state of the perineum, dilatability of vagina, and its secretions, roominess of pelvis, condition of cervix, effectiveness of pains, and should confirm diagnosis of presentation.

(c) *Treatment of the First Stage.*—The bowels should be evacuated by an enema (soapsuds \mathcal{Oj} , turpentine \mathfrak{zj}), urine voided, patient allowed to remain out of bed, examinations to be made at intervals of an hour or hour and a half, and when the os is the size of a silver dollar the patient should be put to bed, lying on that side toward which the back of the fœtus looks.

(d) *Anæsthesia.*—Cocaine and belladonna locally are not effective. Chloroform is not dangerous. Ether is preferable, except in eclampsia. By giving it only in the second stage its administration for too long a time is avoided, and by producing only

analgesia an excessive amount is not employed. For the first stage chloral in 15 gr. doses repeated once, or at most twice, is the only agent permissible.

(e) *Rupture of the Membranes.*—In a primipara the membranes should never be ruptured, and in multiparae only in the second stage. Finger, match, hairpin, etc., may be used to break them, the operation being performed in the absence of a pain, with the assurance that membranes are present, and not the lower uterine segment, thin from pressure of the head.

(f) *Treatment of the Second Stage.*—Examinations should now be made every five or ten minutes. A puller may be employed to increase the abdominal force.

The Perineum.—Bad lacerations of the perineum are avoidable. In primiparae the fourchette is torn in 61 per cent. of cases, the perineum in 34 per cent. ; in multiparae, the perineum in 9 per cent.

Causes :—

(a) Relative disproportion between the size of the head and outlet.

(b) Precipitate expulsion.

(c) Faulty mechanism.

Preventive Treatment.—Depends largely upon the cause. If the disproportion be great, episcotomy may be required ; if expulsion precipitate, retard the head by hand or forceps ; in some faulty mechanisms the forceps can be used to correct them, as by elevating the handles when the head is overflexed, etc. A routine treatment, based upon the most frequent cause, is to *retard expulsion* by resisting the head and pressing it toward the pubes, restraining voluntary efforts and using them during the absence of pains.

The Head.—When the head is born avoid traction, support it for a few moments, and if the cord be coiled around the neck, loosen and slip it over the head, allow the shoulders to pass through it or cut it between two ligatures. If the delivery of the head is further delayed, stimulate the uterus to contraction by frictions through the abdominal wall.

The Shoulders.—Avoid increasing any tear the head may have made.

Treatment of the Third Stage.—Indications are, (1) prevent hemorrhage, and (2) deliver the placenta. Secure contraction and retraction of the uterus by external and internal stimuli: externally, by frictions through abdomen, continued for fifteen minutes and followed by the application of a pad and binder; internally, by administering ʒj of the fld. extract of ergot.

The binder should be 12 in. by 1½ yard, preferably many-tailed, and the pad should be placed *over the umbilicus*.

The placenta is separated by a diminution of the placental area, and its delivery should be accomplished by resorting to the Credé method fifteen minutes after the birth of the child. Remember that the movement of “expression” should be *with a pain*.

The Infant.—Clear out any mucus that may obstruct the air-passages by holding the child by the feet and sweeping the little finger around the mouth. After pulsations in the cord cease, apply two ligatures, for cleanliness, and cut between them across the palm of the hand. The ligature should be tied with the surgeon’s knot, followed by an ordinary bow-knot, to permit tightening after the child has had its warm bath. Before the cord is ligated it should be stripped. The vernix caseosa should be removed by some oily substance, followed by soap and water. Salicylated cotton should be used to dress the cord, and the binder then applied. Look for possible anal, urethral, or other congenital deformity.

Puerperium.

Physiology.

The child-bearing process is divided into four periods, viz: Pregnancy, Labor, Puerperium, and Lactation. The puerperium is the period from birth to the time when the uterus has regained its normal size, which is six weeks. Dimensions of uterus at 9th month, 2 lbs., $12 \times 9 \times 8\frac{1}{2}$ in., 400 cu. in. Dimensions of uterus 6 weeks after labor, 2 oz., 1 cu. in. These changes in the uterus, its lining and adnexa result from the process known as Involution.

Anatomical Development of the Pregnant Uterus.—Subsequent to impregnation the muscle cells take on a new growth, and in

their development hypertrophy into muscular fibres four times as broad and eleven times as long. There is a similar increase in bloodvessels, connective tissue, lymphatics, and nerves.

Anatomical Changes During Involution.—As a result of the decrease in blood supply, which normally repairs tissue waste, the superabundant uterine tissue undergoes degeneration, chiefly fatty, and is carried away by the bloodvessels and the lymphatics, in part as peptones. The process is really an atrophy, which ceases after the enlarged muscle cells have been reduced to their original size. From the anatomical arrangement of its fibres the parturient uterus is composed of two segments, the upper muscular, with its fibres arranged crosswise, the lower largely fibrous, arranged longitudinally. In the process of involution the upper undergoes the greatest change, while the lower, including the vagina, is mainly a retraction of overstretched tissue, which never completely regains its tone. The lining membrane of the uterus, or decidua, is composed of an upper cellular and lower glandular layer. The upper is partly removed when the ovum is delivered, and the remainder disintegrates as the blood supply diminishes, until the epithelial structures of the glandular layer are exposed, and from these epithelial cells in the glandular layer the mucous membrane is renewed.

Lochia.—(a) *Lochia Rubra.* Bloody, last four to five days. (b) *Serosa.* Composed of disintegrating tissue, pus-cells, mucus, and water. (c) *Alba.* Composed of healthy pus.

Quantity.—First four days, 1 kilo., or 2.2 lbs. Next two days, 280 grams, or 15 oz. Until the ninth day, 205 grams, or 7 oz. — $3\frac{1}{4}$ lbs in all.

Quantity is estimated by the number of napkins soiled. In the first twenty-four hours the pads should be changed six times, during the next four days three times a day, and after the fifth day twice a day. A personal examination by the physician should always ascertain their odor, which is at first bloody, later like that of the genitalia. A putrid odor is the danger signal of decomposition and sepsis. Modern observation has demonstrated that the lochia normally contain very many non-pathogenic micro-organisms. They are very numerous

in the vagina and decrease in number toward the cervix. Normally none should be found beyond the internal os.

Conditions modifying the force and frequency of pains which secure involution:—

- (a) Individuality.
- (b) Always greater in primiparæ.
- (c) Over-distention of the uterus.

After-pains.—Uterine action is excited by retained blood-clots. They occur most frequently in multiparæ, and may be distinguished from periuterine inflammation by being cramp-like, intermittent and not increased by pressure, the pulse and temperature not influenced. Paregoric ʒj with ergot ʒss, every two or three hours, will usually control them.

The Circulation.—The *pulse*, which is accelerated during labor to 80 or 90, falls to 60 or lower, as a result of the diminished arterial tension after labor. The *heart* is found to be hypertrophied and dilated, the result of the increased demands made on the circulation during pregnancy. The *blood* undergoes an involution, *i. e.*, the changes which have occurred during pregnancy begin to disappear and it approaches its normal condition. At the end of two weeks it is nearer its normal constitution than during the last four months of pregnancy. Its involution should be watched and its complete return to normal favored by tonics, iron, and good hygiene if necessary.

Secretions and Excretions.—All are more active to diminish the hydræmic condition of the blood, get rid of effete material, and prevent rise of temperature.

(a) *Urinary Function.*—The urine is increased in amount, is more watery, all the solids except the chlorides being decreased. Sugar as lactose is found in 50 to 80 per cent. of cases in quantities varying from $\frac{1}{100}$ to 2 per cent. As the milk becomes dammed up in the breasts it is more apt to be found in the urine. Peptonuria. The kidneys are hypertrophied. There is frequently difficulty in emptying the bladder, which may be due to the following causes:—

(1) During pregnancy the bladder can only expand upward, and this habit is acquired at that time. After labor it expands

in all directions and admits of greater distention before the walls respond and contract.

(2) The abdominal walls are relaxed, and this factor in emptying fails.

(3) Œdema and over-stretching of the soft parts from pressure of the head may diminish the calibre of the urethra and make its course tortuous. The difficulty in such cases often passes away when the catheter is used once.

To prevent this difficulty in urination it has been advised to instruct the patient to practise urination a week or two before labor while lying on her back or dilate the urethra before labor. The latter is only applicable to hospital practice for obvious reasons. Natural urination can be encouraged sometimes by putting under the patient a bed-pan filled with hot water; by putting a hot turpentine stupe on the hypogastric region; by the sound of running water.

(b) *Skin*.—Sweat is increased.

(c) *Lungs*.—Capacity increased. The expired air contains more water and effete products.

(d) *Bowel*.—Sluggish, from pressure.

(e) *Thirst*.—Increased by the large amount of liquid lost.

(f) *Appetite*.—Diminished. Two pounds of muscle (uterus) and the subcutaneous fat developed during pregnancy are being absorbed.

(g) *Weight*.—There is a loss in weight ($\frac{1}{8}$ to $\frac{1}{13}$ of the body weight).

(h) *Temperature*.—No rise of any consequence.

DEVELOPMENTAL CHANGES.

Mammary Function.—Each mammary gland is divided into 15 or 20 lobes, and these are further subdivided into lobules and vesicles. Each lobe has a duct, dilated before reaching but contracted when entering the skin. Forty-eight hours after labor the veins of the breast become engorged, and the breasts are enlarged, painful, and tender. At this time the secretion changes from colostrum to milk. The milk is formed by an overgrowth of the epithelial cells lining the glands, their infiltration with fat and subsequent rupture into the lumen of the

gland. Colostrum is the secretion which appears after the fourth month of pregnancy. It contains no casein, albumin taking its place, which is a laxative to the child.

Diagnosis of the Puerperal State.—Some of the more important signs are: (a) the presence of milk in the breasts, (b) the enlarged uterus, (c) lacerations along the birth canal, and (d) the lochial discharge containing decidual cells.

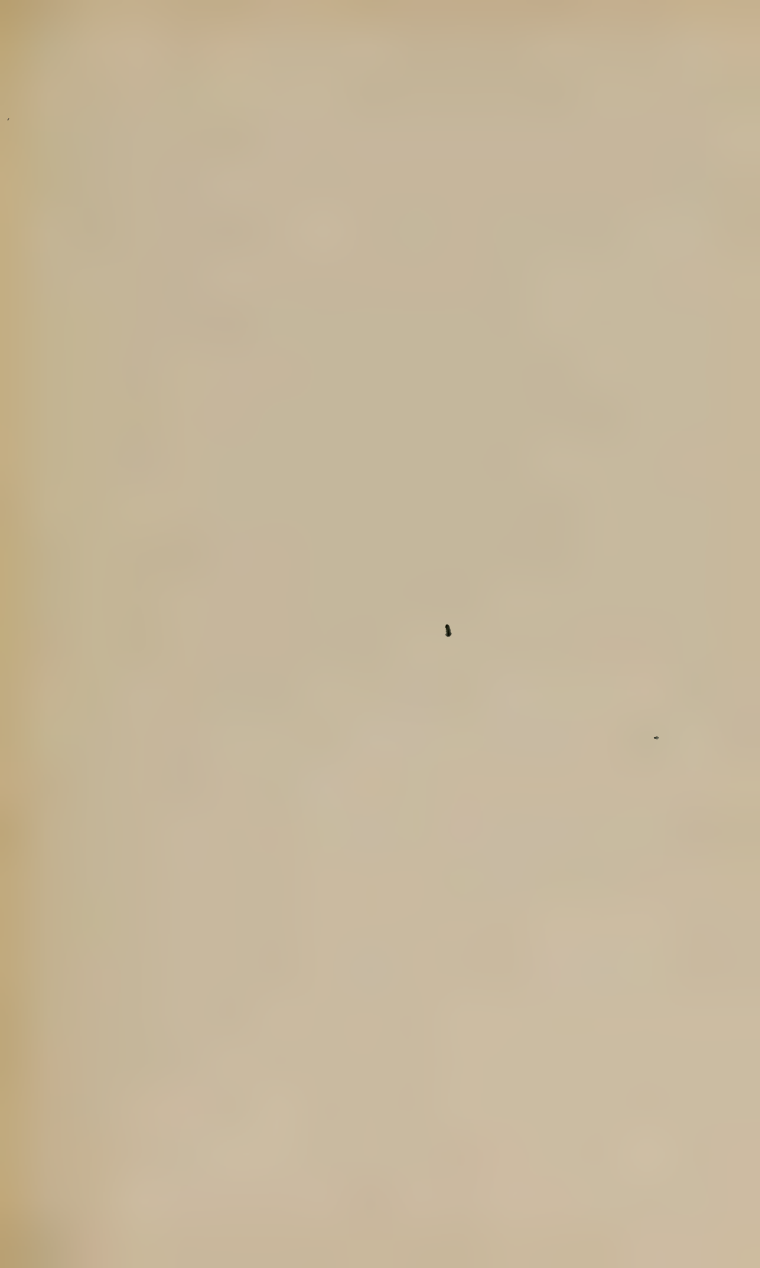
Management of the Puerperium.

1. *Avoidance of Septic Infection.*—Accomplished by securing (a) chemical cleanliness of patient, doctor, and nurse, and (b) removal of all bloody cloths, excretions, and food; (c) secure ventilation, and look for possible insanitary plumbing.

2. *Visits.*—If the labor has occurred in the morning, the patient should be visited in the afternoon and daily for one week, subsequently every other day. At each visit examination should be made of the temperature, pulse, nipples and breasts, and the lochia. The uterus should be palpated to note the progress of involution and the passage of urine inquired for. The child's umbilicus should be examined for any bleeding or inflammation, and passage of its urine and feces noted. The nurse should receive directions as to diet, catheter, and the recording of temperature three times a day.

3. *Secure Rest and Quiet.*—The patient should lie on her back for seven days, and without a pillow for the first six hours, to avoid syncope. She can be made more comfortable by moving her from side to side and alcohol rubbings. She should be kept in bed until the fundus is at or below the symphysis, usually in ten days, when restricted exercise should be enjoined, to prevent uterine disorders, as retro-displacement, etc. In the better classes until the fourteenth day, and restricted to room for four weeks. Involution is best hastened by promoting the natural process and a suitable diet. The prolonged use of ergot is rather unfavorable, because of its effect upon the milk secretion and stomach of mother and child. The degree of quiet should be absolute, and the mother and husband the only visitors admitted while the patient is in bed.

4. *Secure Emptying of the Bladder.*—Never trust anybody's



statement of the passage of urine. The uterus is almost invariably displaced upward and to the right by an over-distended bladder. After twelve hours, if needed, the meatus should be cleansed with cotton dipped in bichloride solution, and a soft and antiseptically clean catheter visually passed at least three times a day.

5. *Diet*.—Opinion differs. A light, easily-digested diet gives least disturbance, and is preferable.

6. *Bowels*.—On the third day castor oil. Compound licorice powder, citrate of magnesia, or other mild laxative may be used, and if the inflammatory changes during the milk formation be great an active saline should be given (an ounce of Rochelle salts in two doses, one-half hour apart).

7. *Breasts*.—For threatened inflammation during the development of lactation give a brisk saline, and if the breasts are too full, empty by the infant, pump, or massage. If the pain and inflammation continue, apply lead-water and laudanum and mammary binder. Mammary abscess is always septic in origin, and should be considered in every case. To prevent it, the nipple, after each nursing, should be washed with soap and water and sweet oil applied. In some cases astringents may be used. The mammary binder is preferably T-shaped, one arm passing around the back, one-half of the remaining arm above, the other below, the breasts, and the two halves brought together between the breasts.

8. *The Child*.—Sleep, cleanliness, and regularity in feeding should be secured. For the first two days it may be fed every four hours, then every two hours during the day, and from one to three times at night. A daily bath, 90°+ F., should be given at noon.

Before ceasing his attendance the physician should make a careful examination to determine the nature and degree of injury done the soft tissues of the parturient tract and to detect a possible displacement of the uterus.

DIRECTIONS TO NURSE.

Before Labor.

I. Have ready towels ; ether, $\frac{1}{2}$ lb.; brandy (2 oz.); vinegar (4 oz.); hot water ; a bottle of antiseptic tablets ; a large, new sponge ; a roll of narrow tape or skein of bobbin ; a fountain syringe ; bed-pan ; new, soft-rubber catheter ; 4 dozen small, 2 dozen large pads ; small package of salicylated cotton ; absorbent cotton.

II. Give a rectal injection (a pint of soapsuds, with teaspoonful of turpentine) as soon as labor-pains are well established.

After Labor.

III. No vaginal injection to be given unless ordered.

IV. Take the temperature three times a day—morning, noon, and evening.

V. Place large pad *under* patient. Occlusive bandage to be used as directed.

VI. The external genitals to be washed off four or five times a day with a warm corrosive sublimate solution 1-2000. Use absorbent cotton for this purpose.

VII. If, at the end of 12 hours, the bladder cannot be emptied naturally, use a catheter. Afterward, if necessary, catheterize patient three times a day.

VIII. The patient is to lie on her back ; she may be moved from one side of the bed to the other several times a day ; her limbs may be rubbed with alcohol and water or bathing whiskey once a day.

IX. *The nurse's hands are to be washed with nail-brush, soap and water, and rinsed in a 1-3000 sublimate solution before catheterizing the patient, cleansing the genitals or breasts.*

Diet.—First 48 hours.—Milk ($1\frac{1}{2}$ -2 pints a day), gruel, soup, one cup of tea a day, toast and butter.

Second 48 hours.—Milk toast, poached eggs, porridge, soup, cornstarch, tapioca, wine jelly, small raw oysters, one cup of coffee or tea a day.

Third 48 hours.—Soup, white meat of fowl, mashed potatoes, beets in addition to above.

After sixth day, return cautiously to ordinary diet.

Child.—I. After being well rubbed with sweet oil, the child is to be bathed in water of $90^{\circ} + F.$; this should be the temperature of the daily bath.

II. The cord is to be dressed with salicylated cotton. Observe carefully for bleeding.

III. It should be bathed daily, about mid-day, in the warmest part of the room. Use castile soap and a soft sponge; avoid the eyes.

IV. The bowels of a healthy infant are moved four times a day, the urine voided 6-20 times. It is usually necessary to change the diapers 18-24 times a day. Use compound or borated talcum powder, lycopodium, zinc oxide, or rice flour. In case of chafe, cold cream and borated talcum powder. Note the color of stools.

Nursing.—The child is to be put to the breast every four hours for the first two days. *No other food is to be given it.* After the second day it should be nursed every two hours, from 7 A. M. to 9 P. M., and twice during the night (1 A. M. and 5 A. M.). After every nursing the nipples are to be carefully washed with a piece of absorbent cotton, warm water and castile soap, and then smeared with a little sweet oil.

Mechanism of Labor.

Definition.—The manner in which a fœtus and its appendages traverse the birth canal and are expelled. It takes into account the complicated structure of the maternal and fœtal parts, considering their movements and the mechanisms of their motions.

Presentation.—That part of the fetal body which presents itself to the examining finger in the centre of the plane of the superior strait.

Position.—May be applied to the position of the child in utero, whether longitudinal or transverse; or, in another sense, it is the varying relations which the presenting part bears to the surrounding maternal structures at the plane of the superior strait.

Presentation and position are determined by abdominal palpation, auscultation, and vaginal examination.

Abdominal Palpation.—The woman should be placed on her

back, with abdomen exposed. The examiner, standing to one side facing her head, by a series of stroking, patting, and rubbing motions, determines the height of the fundus, tension of abdominal wall, irritability of the uterus, quantity of liquor amnii, size of the fœtus, its position and presentation. It is claimed that the placenta can be felt and its position thus diagnosed. It is further asserted that if the greater bulk of the uterus is anterior to the insertion of the tubes, the placenta is anterior, and vice versa.

Position and Presentation.—The palmar surface of the tips of the fingers is carried up the sides of the abdomen, and upon one side (left in the L. O. A. position) is noticed firm, broad, even resistance, contrasting with the cystic, tumor-like sensation of the other side.

This resistance is produced by the back, and, to confirm this, the extremities are searched for by a rubbing motion on the opposite side. Having located the back and the extremities, the portion of the fœtal ellipse presenting at the superior strait is next ascertained.

The examiner now faces the woman's feet, and, with the middle finger over the centre of Poupart's ligament, on either side, the fingers dip down into the pelvic cavity. If the head is presenting, it is felt as a hard, round mass. At the same time its density, compressibility, and approximate size may be learned.

By *auscultation* the fœtal heart sounds are located; their rate and intensity noted. Uterine and funic souffle sometimes heard. The so-called placental bruit does not indicate the position of the placenta.

By *vaginal examination* the finger detects the varying portions of the fœtal body which may present at the superior strait, as cranium, face, shoulder, buttocks, knees, feet, and exceptionally, elbow or hand. (For description of the cranium see page 146; of the anatomical peculiarities of the several presentations, see *Diagnosis* of the various presentations.)

The position of the fœtus in utero is longitudinal in 99½ per cent. of all cases. The cephalic extremity presents in about 95½ per cent., 95 per cent. being vertex cases. In about one-half

of 1 per cent. the face presents; the brow very rarely. In about 3 per cent. of all cases the breech presents, and in about one-half of 1 per cent. the fœtus will be transverse.

Explanation of the Great Frequency of Cephalic Presentations.—Assumption of that position by the fœtus, because it affords it the greatest degree of comfort and the best opportunity for growth and development.

Explanation of the Great Frequency of Presentation of the Vertex.—Mechanical arrangement of fœtal head and body, diagrammatically represented by two bars attached to one another; that representing the head joined to that representing the spinal column, not at its middle, but at a point nearer one end of the bar (T). An equal force exerted upon this mechanical arrangement will result in the greater flexion of the longer bar, which represents that portion of the fœtal skull in front of spinal column.

Positions of Vertex Presentations.—There are four: 1. L. O. A., left occipito-anterior, the occiput looking to left acetabulum. 2. R. O. A. 3. R. O. P., right occipito-posterior, the occiput looking to right sacro-iliac joint. 4. L. O. P. Of all vertex cases 70 per cent. are L. O. A., 30 per cent. R. O. P.

Explanation of Frequency of L. O. A. and R. O. P.—The position of the rectum shortening the left oblique diameter and the projection of the spinal column to which the fœtus adapts its anterior concave surface, the back thus looking forward and turned a little toward the right because of the right lateral version of the pregnant uterus.

FORCES INVOLVED IN THE MECHANISM OF LABOR.

1. *Forces of Expulsion:*—

Uterine muscle.

Abdominal muscles.

2. *Forces of Resistance:*—

Lower uterine segment, cervix, vagina, vulva.

Pelvis.

Fœtal body.

The forces of expulsion are furnished by a great part of the uterine muscle (upper uterine segment) and muscular action of

the abdominal wall. (That portion of the uterine canal which must be dilated to allow the escape of the fœtus is called the *lower uterine segment*; that portion above the point at which the dilatation ceases, *i. e.*, the contracting muscle, is called the *upper uterine segment*; the boundary line between these, often marked by a perceptible ridge, is called the *contraction ring*.)

The Manner in which the Uterine Muscle Exerts its Force upon the Fœtal Body.—By a diminution of the intrauterine area. The abdominal muscles diminish the area of intra-abdominal space. The degree of force exerted by their combined action has been given as from 17 to 55 pounds. The forces of resistance are furnished by that portion of the parturient tract which must be dilated, *i. e.*, from contraction ring to vulva, including (a) *the lower uterine segment, cervix, vagina, and vulva.* The dilatation of lower uterine segment and cervix is not simply mechanical, the serous infiltration of lymph spaces lessening the tendency to contraction and retraction. The dilatation of cervical canal is also assisted by the longitudinal fibres drawing the cervix up over the presenting part. Below the cervix, dilatation is effected mainly by the mechanical stretching of its walls.

(b) *The bony walls of the pelvis.*—Only offer sufficient resistance to so delay the progress of presenting part as to insure gradual dilatation of the soft resisting structures.

(c) *Fœtal body.*—Head most important. The fœtal head may be divided into yielding and unyielding portions. The yielding consists of the cranium, composed of the frontal (2), temporal (2), parietal (2), and occipital bones. These are separated from one another as follows: The two frontals by the frontal suture; the frontal from parietal by coronal suture; the two parietal by sagittal suture; the two parietal from occipital by the lambdoidal suture. At junction of lambdoidal and sagittal sutures there is a membranous space called the posterior fontanelle, triangular in shape. At junction of frontal, coronal, and sagittal sutures there is also a membranous space called anterior fontanelle, kite-shaped, larger than the former. This portion of the skull yields by overlapping of the bones.

The unyielding portion comprises face and base of skull. The bones here are fixed.

A transverse vertical section of the skull is wedge-shaped, tapering toward the neck.

Possible Presentations of the Head.—*Vertex.* That conical portion with apex at smaller fontanelle and base at the plane of the biparietal and trachelo-bregmatic diameters. *Face.* *Brow.* *Larger Fontanelle.* *Parietal Eminence.*

Mechanism of the Several Presentations and Positions.

L. O. A.

Diagnosis.—By abdominal palpation, auscultation, and vaginal examination, the back is found to the left, extremities to the right above, head below, heart sounds one inch below and to the left of umbilicus; the examining finger detects vertex presenting, occiput toward left acetabulum and sagittal suture in right oblique diameter of pelvis, and smaller fontanelle, recognized by the junction of lambdoid and sagittal sutures, the top of occipital bone overlapped by parietal bones.

1st Step.—Accommodation of size of fetal skull to pelvis by flexion, and accommodation of shape of fetal skull to shape of pelvic inlet by moulding. (Occurs before the onset of labor.)

2d Step.—Further flexion and moulding. (Occurs at the beginning of labor.)

3d Step.—Lateral flexion of the head, the left ear approaching the left shoulder, and the right parietal bone presenting. This is to accommodate the direction of the child's body and head to the direction of the parturient canal.

4th Step.—Dilatation of lower uterine cavity and cervical canal.

5th Step.—Descent of head to pelvic floor by extension of fetal spine.

6th Step.—Anterior rotation of occiput. *Cause.*—The head driven through the funnel-shaped parturient canal and meeting the resisting pelvic floor moves in the direction of least resistance, *i. e.*, anteriorly toward median line.

7th Step.—Propulsion and extension of the head until it is delivered.

8th Step.—Restitution. (A theoretical movement not often seen.)

9th Step.—External rotation.

10th Step.—Descent, rotation, and birth of shoulders.

11th Step.—Delivery of remainder of the body.

ABNORMALITIES IN MECHANISM.

(a) *Flexion at Inlet.*—*Imperfect vertical flexion in flat pelvis.* Conservative on the part of nature to bring bitemporal diameter (8 cm.) in relation with contracted conjugate. Associated with this we find anomalies of position and lateral flexion, *i. e.*, the occiput situated transversely, the sagittal suture in transverse diameter of the pelvis and the lateral flexion exaggerated as the result of the increased obliquity of pelvis to trunk and increase of conjugato-symphyseal angle. This is accompanied by overlapping of the right (anterior) parietal bone. In exaggerated lateral flexion the anterior parietal bone or even the ear may present.

(b) *Direction.*—In anterior displacements of the pregnant uterus, there is an abnormal backward direction of the presenting part.

(c) *Rotation.*—Abnormal weakness in resistance or propulsion results in incomplete rotation.

(d) *Vertical Flexion at Outlet.*—Incomplete when head does not encounter normal resistance in pelvic cavity.

(e) *Extension.*—Failure of extension of the head occurs as the result of weakness or destruction of the levatores ani muscles.

(f) *Restitution.*—Fails when neck is a long time twisted or tightly gripped by the vulva.

(g) *External Rotation.*—Due to failure of rotation of shoulders. Is of frequent occurrence.

(h) *Anomalous Descent and Rotation of Shoulders.*

R. O. A.

Diagnosis.—Palpation reveals back to the right anteriorly; extremities to the left above; head below. Heart sounds near median line below umbilicus. Digital examination shows small fontanelle toward right acetabulum; sagittal suture in left oblique diameter.

Mechanism.—Does not differ from the mechanism of L. O. A.,

except the occiput being directed toward the right acetabulum, rotation of head and face occurs in the opposite direction, *i. e.*, the occiput rotates anteriorly, moving from right to the left.

R. O. P., AND L. O. P.

Posterior positions of the occiput are *primary* or *acquired*. Primary when head enters inlet with occiput posterior (common); acquired when head rotates from anterior position at the beginning of labor to a posterior position at its close (rare).

Diagnosis.—Palpation reveals back in the flank (right, in R. O. P.; left, in L. O. P.); extremities to the opposite side in front; head below. Heart sounds in the flank below a transverse line through umbilicus. Digital examination shows small fontanelle toward right or left sacro-iliac joint; sagittal suture in an oblique diameter.

Mechanism.—Similar to mechanism of anterior positions, including anterior rotation of the occiput to symphysis. As a consequence of this prolonged rotation a peculiarity is the rotation of the shoulders at the superior strait through a quarter of a circle, a movement not seen in anterior positions, and in consequence of the greater distance which the occiput has to traverse the clinical manifestations of this stage are different, *i. e.*, there is greater pain and labor is more prolonged. After rotation has occurred the shoulders descend and rotate on the pelvic floor, as in anterior positions. The further mechanism is identical with that of anterior positions.

Cause of Forward Rotation of Occiput.—Same as in anterior positions, *i. e.*, whatever portion of the foetal head first strikes the pelvic floor, whether it encounters this structure behind or in front of the median transverse line, will be directed forward under the symphysis pubis.

ABNORMALITIES IN MECHANISM.

Backward Rotation of the Occiput complicates labor by protracting its course, increasing the danger of foetal death and subjecting the mother to increased risk of injury.

Causes.—1. *Anomalies of Force.*—Anterior rotation is the resultant of the forces of expulsion and resistance, hence any

condition disturbing the normal relation of these forces will interfere with the normal rotation. Thus backward rotation occurs when there is diminished expulsion, increased resistance, or decrease in resistance as occurs in cases of very large pelves, relaxed pelvic floors, small and yielding heads.

2. *Anomalies of Flexion.*—When flexion is imperfect the anterior vault of the cranium (as in those rare cases of presentation of the large fontanelle), the brow, or chin *first strikes the pelvic floor* and is therefore directed forward, and the occiput thus directed backward.

3. *Insurmountable Hindrances to Forward Rotation.*—In some cases when flexion is only partially disturbed and the *occiput* first strikes the pelvic floor, the occiput will rotate backward, because the large diameter of the head (fronto-occip. $11\frac{3}{4}$ cm.) engages and rotation from one oblique diameter of the pelvis, through the smaller transverse to the other oblique, is impossible. The occiput will also be directed backward for the same reason when the foetal head is over size, or accompanied by a prolapsed extremity; when the pelvis is deformed, particularly kyphotic, generally contracted and Naegele's; when there is an abnormal projection of the lumbar and sacral vertebræ interfering with rotation of shoulder. Rarely there may be rotation of the head without a corresponding movement of the body, and thus results an exaggerated torsion of the neck.

Mechanism when Occiput Rotates into Hollow of Sacrum.—The occiput is propelled forward over perineum by increased flexion until the face is finally born under the symphysis by partial extension. This mechanism subjects the cranium of the foetus to dangerous pressure, and increases the danger of perineal rupture.

Abnormalities in Mechanism just described.—Abnormal resistance to descent of occiput, resulting in conversion into presentation of large fontanelle, brow, or face.

Causes.—Projecting ischial spines, central tear of perineum.

TREATMENT OF POSTERIOR POSITIONS OF VERTEX PRESENTATIONS.

Bear in mind the causes of rotation backward, and try to prevent its occurrence. (a) Secure perfect flexion of the head

by placing patient on that side toward which the fetal back is looking. (b) Secure normal action of expelling and resisting forces. If the pelvic floor is weakened and does not supply sufficient resistance, reinforce it by two fingers in the vagina or single blade of forceps. If expulsion is faulty, administer a single large dose of quinine, or forceps may be resorted to. If backward rotation occurs in spite of preventive treatment, extra precautions should be made to protect vaginal walls and perineum from laceration, and to avoid a protracted second stage. These can usually be accomplished by judicious use of forceps. It may be necessary rarely to first convert into a face presentation.

Prognosis.—Not so favorable as in anterior positions of occiput. Forceps often required (once in seven cases). Laceration of soft parts more frequent. The mortality of the fetus increased from 5 per cent. (normal vertex) to over 9 per cent. Luckily backward rotation occurs in only about $1\frac{1}{2}$ per cent. of all labor cases.

FACE.

The head is extremely extended. The chin is the most dependent part presenting, hence the classification by its situation, left mento-anterior, right mento-anterior, etc.

Frequency.—Occurs about once in 250 labor cases.

Diagnosis.—Bulk of cranial vault felt to one side of hypogastric region; a deep groove between occiput and the child's back may sometimes be made out. Heart-sounds loudest over anterior surface of fetus, *i. e.*, on that side of abdomen upon which the extremities are felt. The diagnosis, however, must usually rest on digital examination, which shows before onset of labor high situation of presenting part; flattening of anterior vaginal vault; the contrast between the smooth outline of fetal forehead and irregular contour of the face. As soon as the os is dilated the characteristic features of the face can be felt. Has been mistaken for the breech. Should be considered an abnormality and entails greater danger upon mother and child.

Causes.—Conditions preventing flexion, as tumors of the neck; increased size of thorax; constriction of cervix about the neck;

coiling of cord around neck; tonic contraction of neck muscles.

Conditions favoring extension, as mobility of fœtus; oblique position of child and uterus, especially when abdominal surface of child is directed downward and pelvis is flat; altered shape of head; tumors upon the back, as spinal meningocele. Causes which promote extension of the trunk and shoulders, and consequently of the head, as over-filled bladder of the mother pressing upon the child's back. After the head has reached the pelvic cavity it may be due to the conversion of an occipito-posterior position into that of the face, as already described.

Mechanism.—Comprises the following steps:—

1. Extension.
2. Moulding.
3. Lateral inclination.
4. Descent.
5. Anterior rotation of chin.
6. Its engagement under symphysis pubis.
7. Delivery of head by flexion.
8. Restitution.
9. External rotation.
10. Delivery of body as in vertex presentation.

ABNORMALITIES IN MECHANISM.

The most common is delay in forward rotation of chin under symphysis. This is due to the difference between the lateral depth of the pelvis ($3\frac{1}{2}$ inches) and the length of the fœtal neck ($1\frac{1}{2}$ inches), *i. e.*, the chin does not meet with sufficient resistance. Should the chin be directed posteriorly, where the depth of the pelvis is even greater, the delay is absolute, and such cases can only be terminated by artificial assistance. If left to nature the upper portion of thorax (9 cm.) is forced in the pelvic cavity, along with the posterior half of the child's skull ($9\frac{1}{2}$ cm.), and it is impossible for these two diameters to pass through the pelvis.

Prognosis.—Fœtal mortality 13 to 15 per cent. Maternal, from less than 1 to 6 per cent.

Treatment.—If the chin is directed well forward, the case

may require no interference at all. Often, however, these cases are difficult and demand active treatment. Before labor begins, or in the early stages, convert into vertex by the method of Schatz (external manipulation). If this fails, the method of Baudelocque (internal and external manipulation) should be tried. This failing, version may be attempted if the face is not impacted in the pelvis. While labor is in progress, guard against rupturing the membranes, that the os may be more thoroughly dilated and the liquor amnii not drained away. If anterior rotation of the chin is delayed, it may be hastened by two fingers pressing on the cheek and chin; or, if necessary, pressure may be applied with a single blade of the forceps. These failing, straight forceps may be used to effect rotation, and if the chin is directed anteriorly traction may be made. If the chin is directed backward, traction should *not* be employed. Finally craniotomy may be necessary. When the case progresses with or without assistance care must be exercised in the final delivery of the head, not to push the neck too forcibly against symphysis when trying to prevent laceration of the perineum.

BROW.

Head midway between complete extension and complete flexion. The largest diameter of the head presents. Of all presentations of the head it is the most unfavorable for mother and child. The four positions are classified according to the direction of the chin.

Frequency.—In Guy's Hospital there were 14 brow presentations among 24,582 births (1 in 1756).

Diagnosis.—Is made by a digital examination.

Mechanism.—The steps are similar to those of face presentation. When the chin is directed posteriorly the case is an impossible one for the same reason as in the posterior position of the face.

Prognosis.—Foetal mortality, 30 per cent. ; maternal, 10 per cent.

Treatment.—Before labor convert into vertex. This can sometimes be accomplished by external pressure on the occiput to secure flexion. If this fails, insert hand in the vagina and pull

occiput down. Next try to convert into face if the chin is anterior. If this fails, version should be tried. It should not be resorted to if the waters are drained off or the presenting part is fixed in the superior strait. Finally, if the chin is anterior, apply forceps; if posterior, and conversion into vertex presentation, performance of version and rotation are all impossible, craniotomy is indicated. In face and brow presentations with the chin posterior, the cardinal rule is not to use forceps except as rotators; if traction is resorted to at all, even in mento-anterior positions, it should be employed with the greatest caution and gentleness. *Very rarely* the head may be brought down far enough to meet with resistance, and thus be rotated anteriorly, but unless the head yields to moderate traction, embryotomy is preferable.

PRESENTATION OF THE GREATER FONTANELLE.

The head is midway between flexion and extension. In its clinical features this presentation resembles a brow. The descent of the head is difficult and tedious, the anterior (frontal) portion rotates forward, but with great difficulty, and serious injury to the maternal soft parts is almost unavoidable.

Treatment.—Convert into a vertex presentation by pulling down the occiput with the fingers.

BREECH.

Presentation of any part of the pelvic extremity of the fetal ellipse. The classification is according to the direction of the sacrum, left sacro-anterior, right sacro-anterior, etc.

Frequency.—Occurs in 1.3 per cent. to 3 per cent. of all cases, the first figures referring to mature births alone.

Causes.—1. Abnormalities in shape of fetus or uterine cavity. Include reversal of uterine ovoid (the lower uterine segment larger than upper); fetal monstrosities; twin pregnancy (in 25 per cent. of cases the breech presents). 2. Increased mobility of the fetus.

Diagnosis.—Head above, breech below. Heart sounds are heard on a transverse line above umbilicus. Digital examination shows high position of the presenting part; absence of

dome-like projection of vaginal vault which is found in presentation of head ; the bag of waters projects as a pouch-like protrusion ; by pressure on the fundus with the other hand the characteristic features of the breech may be detected, *i. e.*, the nates and sulcus between them, tip of sacral bone and coccyx, the thighs, external genitalia and anus, evacuation of meconium, which in breech cases is not of serious import.

Mechanism.—Comprises the following steps :—

1. Descent of breech to pelvic floor. Occurs very slowly because the soft breech is an ineffectual dilator of the cervix and ineffectual irritator of reflex uterine contraction, hence many hours may be required.

2. Rotation forward of anterior hip. The anterior hip first strikes the pelvic floor, but owing to the insufficient resistance which the soft breech encounters the rotation is imperfect.

3. Birth of anterior hip, posterior hip, thighs, and trunk.

4. Engagement and descent of shoulders in oblique diameter.

5. Rotation forward of anterior shoulder.

6. Birth of anterior followed by posterior shoulder.

7. Descent of head in oblique diameter.

8. Rotation forward of occiput, which is always the part to first strike the pelvic floor.

9. Delivery of head in the following order : Chin, face, forehead, anterior fontanelle.

Prognosis.—Fœtal mortality 30 per cent., including badly managed cases. There is some added danger of injury to maternal soft parts.

Treatment.—Before labor, external version, if practicable. After labor has begun, inaction until body is born to umbilicus, unless maternal or fœtal life threatened. At this time interfere, bring the patient in the lithotomy position to edge of bed, and deliver by pressing upon fundus with one hand, the other hand in the vagina to favor anterior rotation of the shoulder, flexion of the head, and to direct the head through the vagina.

ABNORMALITIES IN MECHANISM.

The most frequent and important are (1) backward rotation of the occiput and (2) excessive rotation of the breech. Backward rotation of the occiput is very exceptional, and the mechanism now differs as the head remains flexed or becomes extended. When flexed, the chin, face, forehead, anterior fontanelle slip out under symphysis in the order named, and the head is delivered. When extended, the chin catches upon the symphysis, the head is extremely extended and is born by the occipital protuberance, small fontanelle, cranial vault and face slipping over the perineum. The following rules for managing these cases should be remembered : If flexed, the body of the child should be carried downward. If extended, the body should be carried upward over the mother's abdomen. Excessive rotation of the breech occurs as the result of prolapse of posterior extremity, and is of no great practical importance.

SHOULDER.

Transverse position of the child in utero resolves itself into a shoulder presentation as the result of uterine contraction when labor begins. Shoulder presentations are classified according to the position of the back and head. When the head is to the right the back can be in front or behind. The same is true when the head is to the left. The back is directed anteriorly twice as often as posteriorly, and the head more than twice as often is found toward the left.

Diagnosis.—Abdominal palpation reveals the fœtus in a transverse position. The heart-sounds are more distinct at a point corresponding to the interscapular region of the child, and sometimes cannot be heard. Digital examination shows the characteristics of the shoulder, viz., axilla, clavicle, spine of scapula, acromion process, head of the humerus, ribs.

Causes.—1. Abnormalities in the shape and position of the uterus, as pendulous abdomen ; uterus bicornis ; kyphotic spine ; uterine fibroid and other abdominal tumors ; multiple pregnancy (in twin pregnancies the shoulder presents once in 22 cases).

2. Conditions preventing engagement of cephalic or pelvic

Typeset in the original

100 Extraordinary version

extremity, as deformity of the pelvis ; abnormally large child ; monstrosities ; placenta prævia.

3. Abnormal mobility of the fœtus, as occurs in hydramnion, after foetal death, or in premature birth.

Mechanism.—Strictly speaking, there is no mechanism of shoulder presentations. The course of these cases is impaction of the shoulder, ascension of contraction ring, destruction of the fœtus by prolonged pressure, and death of the mother by rupture of the uterus or exhaustion. As a matter of fact, however, nature can in exceptional cases effect delivery in one of three methods :—

1. Spontaneous version. The transverse position converted into a longitudinal by uterine contraction.

2. Spontaneous evolution. The breech slips past the shoulder and is delivered.

3. Body doubled up (*corpore reduplicato*).

Treatment.—Version.

MECHANISM OF THE THIRD STAGE OF LABOR.

Theories of Separation :—

(a) Placental area diminished.

(b) Placenta pushed off.

(c) Separated by retro-placental clot.

The first probably correct.

Theories of Expulsion :—

(a) Edgewise (Matthew Duncan).

(b) Like inverted umbrella (Schultze).

The last probably correct.

ABNORMALITIES.

(a) *Retention.*—Occurs frequently. Hemorrhage is slight. The placenta is situated in the dilated lower uterine segment and upper portion of the vagina.

Treatment.—Proper application of Credé's method of expression. Sometimes atmospheric pressure determines its retention ; a finger then may be hooked over one edge to pull it down.

(b) *Adhesion*.—Occurs once in 312 cases, and is usually partially detached.

Diagnosis.—Credé method of expression fails and there is alarming hemorrhage.

Treatment.—Pass the hand along the cord to the fundus and complete the separation with the finger-tips, using them as a paper-cutter; pinch through any dense spots of adhesion, close the fingers about the placenta, stimulate the fundus by friction through the abdominal wall, and allow uterine contractions to expel the hand and contained placenta.

Prognosis.—Many die from hemorrhage; seven per cent. from sepsis. Most exceptionally the placenta can be retained in utero for months without doing harm. Among the rarest anomalies in regard to the placenta during labor are hernia of the placenta through the muscular coat of the uterus during labor, and prolapse of the normally situated placenta. The latter is most likely to happen with twins, after rupture of the uterus, or in premature labor, but it has been observed at term, without injury to the uterus, and in a single pregnancy. There is not necessarily profuse hemorrhage nor other disadvantage to the woman, but the fœtus dies unless it is extracted at once.

Obstetric Operations.

Induction of Premature Labor and Abortion.

ABORTION.

When performed before viability of child (180th day).

Indications.—When the patient is a subject of disease originating in or aggravated by pregnancy and life endangered thereby, viz.:—

1. *Pathological Vomiting*.—Only after all known remedies and rectal alimentation fail.

2. *Grave Albuminuria*.—As when œdema, headache, casts, failing vision, etc., threaten eclampsia.

3. *Death of the Embryo or Fœtus*.

4. *Certain Intrauterine Diseases*.—As acute hydramnios and cystic degeneration of the chorion villi.

5. *Uterine Hemorrhage* from placenta prævia (partial and central) may be so profuse as to demand interference early in pregnancy.

6. *Certain Nervous Diseases*.—As acute mania, melancholia, or associated inflammatory changes in the brain. Rarely chorea.

7. *Certain Blood Diseases*.—Pathological hydræmia (pernicious anæmia), leucoëthemia.

8. *Displacements of Gravid Uterus*.—Retroflexion, prolapse, hernia, resisting other treatment.

Always secure consultation and share responsibility.

Methods.—Many have been resorted to, but have been found either too dangerous, slow, or ineffectual. Such are the use of ergot, cotton-root, injections upon cervix or between membranes, inflated rubber bags in vagina or uterus, rapid or gradual dilatation of the cervix, perforation of the membranes, electricity.

The method recommended is a combination of the good features of some of those mentioned, and is as follows:—

1st. Disinfect canal by antiseptic douche and pledget of mercurialized cotton in cervix.

2d. Fix anterior lip of cervix with tenaculum and dilate cervix to size of thumb with Hegar's dilators.

3d. Iodoform gauze tampon in cervix and lower uterine segment, and a tampon of antiseptic wool in vagina. Remove at the end of 24 hours. If the ovum is not discharged from the uterus, dilate the cervix further and reapply a larger tampon. The discharge of the ovum is often facilitated by introducing placental forceps and nipping off a small piece of decidua. When the second tampon is removed, if the ovum has not come away, remove it, using, with strict antiseptic precautions, the finger, or, with greatest care, curette. If there is urgency in the case and the patient can stand an anæsthetic, ether is given, the os dilated with bougies and fingers, the ovum cleared out with finger, curette, and placental forceps, leaving the uterus *clean*. An iodoform gauze tampon is then inserted and allowed to remain 24 hours to insure drainage.

While the interruption of pregnancy before the 180th day is called the induction of abortion, the method given is only appli-

cable up to the fourth month. After that time the plan is the same as for the induction of premature labor.

PREMATURE LABOR.

When performed after viability of child.

Indications.—1. *For diseases as above.*

2. *Special Indications.*—As (a) Contracted Pelvis (8–9½ cm.), (b) Placenta Prævia, (c) Advanced Phthisis, Grave Heart Disease, etc. threatening mother's life, (d) Habitual Death of Fœtus just before term.

Methods.—Antiseptic vaginal douche, Sims's position or dorsal decubitus, aseptic hard-rubber bougie passed in for 7 or 8 inches between deciduæ vera and reflexa, and kept in place by vaginal tampon of iodoform gauze. Labor begins after a variable period, 3 hours to a week, the average being 36 hours. The introduction of a second and larger bougie may be necessary after 12 hours. After 36 hours, if softening of the cervix has been accomplished, it may be further dilated by means of Barnes's bags.* A very satisfactory plan recently introduced (Pelzer) is the injection of about 2–4 oz. of sterilized glycerin between the membranes by means of a rubber tube attached to a syringe. If the mother's condition demand immediate delivery, the method is as follows: (a) Perforate the membranes; (b) forced dilatation of cervix with fingers or Hegar's dilators, followed, if it is still impossible to insert the whole hand, by Barnes's bags (each remaining 15 minutes); (c) forceps, or, preferably, version and extraction (accouchement forcé).

* To apply Barnes's bags successfully the following points should be borne in mind: Before using them the capacity of each bag should be tested with syringe; to secure entrance into cervix roll the bag in its long diameter and catch with dressing forceps; apply the rubber tube to the rectal nozzle of syringe, and after inflation compress with catch forceps. Allow the bag to remain in place for one hour, leaving the patient in lithotomy position in bed, to prevent rupture of the bag.

Atmospheric pressure
at sea level

Barometer at sea level

Red Sea 250 ft. deep
at sea level
at the mouth of the Red Sea
gauge.

Forceps.

USES AND FUNCTIONS.

- (a) Tractor—most important.
- (b) Rotator.
- (c) Lever.
- (d) Compressor—dangerous.

Indications:—

1. *Anomalies in Expulsive Forces*—as uterine or abdominal inertia.

2. *Anomalies in Resistance*—in the pelvis, soft parts, or foetal body, as minor degrees of contracted pelvis, abnormal rigidity, or large foetal head.

3. *Threatened Foetal Life*—as prematurely detached placenta, compression or prolapse of the cord, prolonged pressure on foetal head, feebleness of foetal heart, sudden death of mother, during the second stage of labor. If the heart sounds sink to 100 for a minute forceps should be applied.

4. *Debilitating diseases, acute or chronic, rendering the ordinary forces insufficient*—as phthisis, typhoid, heart disease, etc. In such the forceps should be applied at the beginning of the second stage to avoid asphyxia or to save the mother's strength.

5. *Life Endangered*—as in heart-clot, eclampsia, hemorrhage, rupture of uterus.

6. *Abnormal Positions and Presentations and Anomalies in the Mechanism of Labor.*—As in face presentations to secure anterior rotation of chin; elevating or depressing the handles when the head is over-flexed or under-flexed.

As a general rule, they should be applied when the head, during the second stage, has been stationary for two hours.

Contraindications:—

1. *Os must be dilated.* Exception. When maternal or foetal life is threatened, it is allowable to apply them to a partially dilated os, as when rupture of the uterus is threatened, as shown by the approach to the umbilicus of the groove over the contraction ring.

2. *Head must have engaged at the superior strait.* Exception. To bring head down as a tampon in marginal placenta prævia.

3. *Membranes must be ruptured.*

4. *Must not be used as tractors in impossible positions and presentations*—as face with chin posterior.

5. *Should not be employed unless head be of average size.* If too small or too large, apt to slip and lacerate the soft parts.

6. *Should not be employed when the disproportion between the head and canal is too great.*

Forceps in Contracted Pelves.—Two factors, size of foetal head and degree of contraction, must be considered to determine between the use of forceps at term and induction of premature labor. The determination of the size of the foetus must be left to each individual's skill and experience in abdominal palpation. In contracted pelvis, if *justo-minor*, with conjugate $9\frac{1}{2}$ cm., or over, it is justifiable to deliver with forceps at term. If the conjugate be less than $9\frac{1}{2}$, induce labor preferably at 36th week.

In the *simple flat* or *rachitic flat*, 9 cm. is the limit in primiparæ; $9\frac{1}{2}$ cm. in multiparæ, whose uterine and abdominal forces are not so strong as in primiparæ, and in whom rupture of uterus is more apt to occur. There are, however, no well-defined rules, but it may be said that when the case is seen early in the labor version or nothing is the treatment, the former only when the natural forces are insufficient to secure engagement. The use of the forceps to fix the head in the superior strait is justifiable if one has skill in their use and judgment to determine when the attempt should cease. If the head is in the superior strait, it is forceps or nothing, the former when interference is indicated. Remember that the operation is a difficult one. The instrument has to be inserted a greater distance, prevents nature's mechanism, grasps the head over forehead and occiput, and is thus more likely to injure the skull and its contents and is more liable to slip from the head, injuring the vagina. As beginners you will not dare to rotate the blades to the side of the child's head. The obliquity of the pelvis is greater, making it more difficult, even with an axis-traction instrument, to deliver in the axis of the parturient canal. Finally, a choice must be made of forceps, version, craniotomy (if the child is dead), or symphysiotomy—the last only when the

head cannot be brought through the pelvis without the certain destruction of the child.

Forceps Recommended.—Simpson, for the low operation, Poullet v. Hecker or Tarnier, for the high operation. Sawyer's, to protect perineum as the head emerges.

Rules for Application.—In using the Simpson forceps, the left blade is always applied first. The *left* blade should be held in the *left* hand and introduced into the *left* side of the pelvis. *Right* blade *right* hand, *right* side of pelvis.

With the diagnosis of the presentation assumed, and the vagina douched if there is a suspicion of gonorrhœa or septic discharge, the steps in the application of the blades may be summarized as follows:

1. Having introduced two fingers of the right hand into the vagina, the left blade, grasped at the lock by the left hand as a pen, is held almost perpendicularly, with the tip of the blade opposite the vulva.

2. The tip of the blade should enter the vagina and traverse the perineum toward the sacrum.

3. Rotate the blade outward in its long axis, to bring it in apposition with the posterior inclined plane of the pelvis, and thus escape the promontory of the sacrum when the handle is depressed.

4. Depress the handle, carrying it to the left side, the fingers of the right hand in the vagina guiding the blade and protecting the soft parts.

5. Introduce the right blade in a similar manner, substituting right for left in the above description.

6. To grasp the head properly and facilitate locking, rotate forward the *right* blade when the head occupies the right oblique diameter (L. O. A. and R. O. P.), the *left* when the head is situated in the left oblique (R. O. A. and L. O. P.). Depression of the handles towards the perineum often aids locking.

Too great compression of the head may be avoided by placing a folded towel between the handles. Traction should be made in a line parallel to the axis of the parturient canal—with the pains when present, at corresponding intervals when absent.

During the intervals between the tractions the grip on the handles should be relaxed to release the head from compression.*

Preliminaries to the Operation.—Always secure patient's consent to avoid blame if an accident occur. An anæsthetic always renders the operation less difficult, but when it is to last only a short time (half hour) it may often be dispensed with. The disadvantages of an anæsthetic are vomiting, possibly post-partum hemorrhage, and retardation of the milk secretion for 24 hours. The lithotomy position at the edge of the bed is the most convenient. The blades should be immersed in a 5 per cent. solution of carbolic acid or boiling water, rubbed with a 50 per cent. solution of carbolic acid in glycerine and folded in a clean towel. Just before using them vaseline should be applied to their outer surfaces.

Extraction of Breech.

Breech labors are normally slow and tedious. The indications for interference are : Delay for 24 to 36 hours ; rapid and feeble pulse ; exhaustion and perhaps elevated temperature ; bad foetal heart sounds.

Methods of Extraction in the Order of their Efficiency.

1. *Manual.*—Seizing a foot by passing the hand into the uterus, extracting the leg up to the knee, thus “decomposing” the breech presentation, and affording a convenient handle by which to control the subsequent progress of the foetus. Another plan is to place the hand on the infant's back so that the little and fore fingers hook over the crests of the ilia, while the middle and third fingers are extended along the spine. This is not so good. For both manœuvres the patient must be anæsthetized.

2. *Forceps.*—Apply over the trochanters and avoid compressing the handles. Make traction by hooking fingers over shoulder of instrument.

3. *Fillet.*—Each end of a strip of bandage is passed between a thigh and the abdomen, brought down in front of the external genitalia and drawn tight until the centre of the bandage is

* The skill and manual dexterity required in all forceps operations can only be acquired by actual practice ; hence the student must avail himself of the opportunity to learn the technique of all the operations in the Laboratory of Operative Obstetrics.

Version is an operation by which we
bring one end of a chain of the same
links into the to form the
surface of a chain

in contact with the child's spine. Very difficult to apply, and therefore of little practical value. Requires anæsthesia. There is a perforated blunt hook in the shops which facilitates its application; also an apparatus on the plan of Bellocq's canula.

4. *Blunt Hook*.—Caught between the child's thigh and abdominal wall. It is very apt to fracture the thigh or perforate the abdomen, but may be employed before resorting to embryotomy.

Version.

Version is an operation or manœuvre to change the position of the fœtus in utero.

Varieties:—

- (a) Version by the head (cephalic).
- (b) Version by the breech.
- (c) Podalic.

Methods:—

- (a) Postural.
- (b) External manipulation.
- (c) Internal manipulation.
- (d) Combined or Bi-polar.

Indications for Version:—

1. Presentations of the trunk—usually shoulder.
2. Deformity of pelvis.
3. Sudden dangers, when the head presents, but is not engaged, and the child is to be delivered rapidly, as eclampsia, heart-clot, premature detachment of placenta, rupture of uterus, death of mother.
4. Malpositions of the head, as presentations of the ear, parietal bone, brow or face.
5. Placenta prævia.
6. Prolapse of cord.

In all cases combined version should be tried first, followed by podalic if combined fails.

Contraindications:—

1. The presenting part should not be engaged nor out of os.
2. High position of contraction ring.

Conditions rendering the operation difficult, dangerous, or impossible:—

(a) An undilated and undilatable vagina.

(b) A similar condition of cervix, as in placenta prævia, where the operation is performed early. Always anæsthetize and overcome the rigidity gradually.

(c) Inability to effect an entrance into the uterus, as occurs when the liquor amnii has been lost and the uterus is retracted, when the uterus is permanently contracted (tetanus of uterus so called) or when there is obstruction by the fœtus, as hydrocephalus, spina bifida with meningocele. Should the arm be prolapsed the hand can usually pass it. Sometimes the arm is purposely brought down to facilitate the version.

(d) Inability to bring the feet down after they are grasped. This may often be accomplished by applying a fillet to the foot, and while traction is made, the other hand in the vagina endeavors to push up the shoulder.

(e) Conditions interfering with external hand, as excessive amount of fat in abdominal wall, hysteria, chorea, epilepsy, eclampsia.

Conditions Most Favorable for the Operation:—

(a) Uterus distended by liquor amnii.

(b) Os dilated.

(c) Uterine muscles not irritable.

(d) Abdominal muscles flexible and thin.

(e) Cervix not rigid.

Postural.—This method may be used in deviated vertex presentations. Ear presenting, turn the patient on the side, so that breech may drop to that side and thus bring vertex over os. Brow presenting, turn to that side toward which the face looks, and thus secure flexion and cause vertex to present.

External.—May be used before labor to correct breech or transverse presentations, and thus reduce fœtal motility. Pads and a binder should be applied to prevent return to original presentation. Both postural and external version are refinements in obstetric procedures.

Combined.—The patient should be placed in the lithotomy position and anæsthetized. Externally use the hand nearest the part acted upon, operator facing the mother.

Head is preferably brought to superior strait because it is usually nearer centre of pelvis, is more easily manipulated externally and vertex presentation most favorable to *fœtus*.

Podalic.—Preliminaries: (a) Secure relaxation of uterus and abdominal muscles by anæsthetic. (b) Secure lowest position of fetal feet by turning mother on that side toward which the feet point. (c) Use that hand, made aseptic, which midway between pronation and supination corresponds to abdomen of the child. Grasp foot with the first two fingers, curling the thumb in the palm of the hand to gain room. The hand reaches the anterior foot first, and the advantages of resting content with traction on a single foot are:—

(a) A further entrance into uterus is unnecessary.

(b) Easier to hold.

(c) The other doubles up along the abdomen and thus dilates cervix more thoroughly.

(d) Secures sacro-anterior position of breech, which is desirable.

When the knee is born *cease traction*, unless there exists some indication for immediate delivery, stop the anæsthetic, turn the patient on her back, listen to fetal heart sounds and leave the further delivery to nature until the thorax appears. The arms should now be delivered, the posterior arm first as the concavity of the sacrum furnishes more room for the necessary manipulation, after which the head should be delivered.

EXTRACTION OF THE AFTER-COMING HEAD.

If the arms are extended alongside of the child's head, they should be delivered as follows: Locate the posterior arm by the position of the trunk and shoulders. To deliver the right arm grasp the legs with the left hand (the middle finger above the internal malleoli, the index and ring fingers above the external malleoli), and raise the child's body upward and outward over the mother's right thigh. This movement should be sufficiently forcible to bring the right shoulder well down in the pelvis. The first two fingers of the right hand entering the vagina in contact with the right scapula are passed along the posterior surface of the arm beyond the elbow when the arm and forearm are pushed in front of the child's face. The fin-

gers are now hooked in the elbow-joint and pull directly downward until the elbow appears at the vulva, the forearm flexed upon the arm. The forearm is easily delivered by extension. The left arm is brought down and delivered in a similar manner, *i. e.*, the right hand grasps and lifts the child as described above, and the first two fingers of the left hand enter the vagina and carry out the procedure as described. Should the shoulders occupy a transverse position, either arm may be brought down and delivered first. After delivering the arms, the head should be extracted by the following methods in the order given :—

- (a) Wiegand.
- (b) Mauriceau (often called Veit-Smellie).
- (c) Prague.
- (d) Forceps.
- (e) Deventer.

Not more than five minutes should be consumed in the operation. These methods may be briefly described as follows :—

Wiegand.—Introduce the first three fingers of the supinated hand into the vagina (using that hand whose palm corresponds to the abdomen of the child), at the same time resting the abdomen of the child upon the forearm with a leg hanging on either side. Insert the index finger in the child's mouth, being careful to avoid the eyes, and exert sufficient traction on the lower jaw to secure and maintain flexion of the head. The disengaged hand now locates the head through the abdominal wall above the pubis, and the further delivery is accomplished by supra-pubic pressure in the axis of the parturient canal and elevation of the child's body toward the mother's abdomen.

Mauriceau.—Proceed in the same manner as just described until the disengaged hand is to be used. The middle finger of this hand, pronated, is passed along the back of the neck until it finds the occiput, when pressure is employed to further flex the head. The index and ring fingers are now flexed over the clavicles, and traction is made in the axis of the parturient canal (downward and outward), the trunk is carried toward the mother's abdomen, and at the same time the fingers in the mouth and on the occiput are securing complete flexion of the

head. Properly directed supra-pubic pressure by an assistant increases the efficiency of this method.

Prague.—Grasp the child's ankles with the right hand, pronated, placing the middle finger between the legs just above the internal malleoli, the index and ring fingers above the external malleoli. The index finger of the left hand is flexed over one clavicle and the remaining fingers of the same hand over the other clavicle. Traction directly downward is now made with both hands until the perineum is well distended. The right hand then loosens its hold upon the ankles and again grasps them as described above, approaching them at their anterior surface. The child's feet will now be in contact with the back of the right hand. Raise the feet by a circular movement toward the mother's abdomen, using the left hand, as originally placed, as a fulcrum around which the head moves until its final delivery.

Forceps.—An assistant should raise the child's body, arms and legs, thus removing them out of the way of the operator, who rapidly applies the blades to the sides of the child's head. Traction is made in the axis of the parturient canal, and the head is finally delivered by elevating the handles, the disengaged hand protecting the perineum as much as possible.

Deventer.—Steady downward traction until the whole child is delivered, with arms still up alongside the head, the occiput being rolled out under the symphysis. To do this the woman's buttocks must project beyond the bed and the child be carried well under them. The operation is only possible in the most favorable conditions, and not always to be relied upon. It has, however, the merits of simplicity and rapidity.

Embryotomy.

Embryotomy is mutilation of the fœtus, and comprises several operations :—

- (a) Craniotomy.
- (b) Decapitation.
- (c) Evisceration.
- (d) Amputation of extremities.

Craniotomy.—Comprises opening the head, diminishing its size, and its extraction.

Indications when the Child is Dead.—When the mother can be saved risk or suffering by the child's delivery.

Indications when the Child is Living.

(a) When the head is very large.

(b) When the pelvis is very small.

(c) In some faulty positions of cephalic presentations, as face with chin persistently posterior ; brow.

Many authors advise the operation when the conjugate measures 6-8 cm., but the size of the head, its compressibility, and the muscular power of the woman are elements to be considered. Premature labor, when possible, should be the treatment. At term, forceps, version, Cæsarean section are alternatives. Always secure a consultation to share responsibility.

Instruments for Operation.

1. Perforator. Blot's. Smellie or Hodge scissors.

2. Large catheter and carbolized solution for washing out brain substance.

3. Cephalotribe. Karl Braun's, Tarnier's Basiotribe.

4. Cranioclast. Karl Braun's or Hirst's.

The operation consists of the following steps :—

(a) Etherization.

(b) Vaginal douche of bichloride solution.

(c) Volsella forceps to steady scalp.

(d) Perforation of cranium (through fontanelle).

(e) Contents of cranium washed away.

(f) Crushing with cephalotribe (if necessary).

(g) Extraction with cranioclast or cephalotribe (if used).

In easy cases perforation alone sufficiently lessens the size of the head to allow its birth.

When the contraction is so great as to require crushing, Cæsarean section is preferable if the child is living.

If the child is hydrocephalic, breech presenting, and head cannot be reached, open the spinal canal to evacuate the brain.

Decapitation.

Indication.—Impacted shoulder presentation.

Instruments.—Braun's hook, or Ramsbotham's sharp hook (two

or three sharp twists). A string with sawing movements may be used in an emergency, the vagina being protected with a speculum.

Amputations and *Eriscerations* are very rarely indicated. Some forms of monsters may require them.

Symphysiotomy.

The operation is a subcutaneous division of the pubic joint, allowing diastasis of the bones during labor, the child being delivered by the natural passage. Was suggested for the first time in 1598, performed for the first time on a living woman in 1777 by Sigault. In 1866 the operation was revived, and from that time to 1886 it was performed seventy-one times, with a death-rate of 25 per cent. It was thought that little space was gained, and that the operation should no longer be employed. But by a separation of the symphysis up to 7 cm. the antero-posterior, the transverse, and the diagonal diameters are increased respectively, 1.4, 3.10, and 3.5 cm., and clinical study has proved its utility in pelves with a conjugate above 6.5 cm., and the statistics since 1886 with aseptic methods—204 operations and 25 deaths—show that the operation is a comparatively safe one, the deaths being almost all due to some cause aside from the mode of delivery.

Technique of the Operation.—Short incision on lower abdomen to within three-quarters of an inch of symphysis; separation of attachment of recti muscles just sufficient to admit one finger (left index), which is passed behind and hooked under symphysis; Galbiati's knife is passed along this as a guide, and the symphysis cut from within outward and below upward. Injury to the bladder and urethra is avoided by a catheter placed in the urethra, which is pressed downward and to the right, the knife being inclined a little to the left. When the symphysis is severed, the child is delivered with forceps or spontaneously, the trochanters being supported to prevent injury to sacro-iliac junction. The wound is sewed and a firm binder applied.

Cæsarean Section.

When the escape of the child by the natural passage is impossible, it may be delivered by an abdominal and uterine in-

cision (Cæsarean section). Cæsarean section may be performed ante- or post-mortem.

Post-mortem Cæsarean Section.—When the death of the mother is assured, cut open the abdomen and uterus with any instrument at hand. A living infant has been extracted twenty minutes, three-quarters of an hour, and even two hours after the death of the mother. Rapid version and extraction before the child's death may be substituted, and can be done in from three to five minutes.

Cæsarean Section upon the Living Woman.—Performed for the first time in 1500. Five years ago, in England, the death-rate was $99\frac{9}{10}$ per cent.

Varieties :—

Porro-Cæsarean.—In 1876 Porro modified the operation by performing, in addition to laparo-hysterotomy, a laparo-hysterectomy, *i. e.*, removal of the uterus. The stump is fixed in the abdominal wound preferably by Koeberle's nœud. In 150 cases the death-rate was 54 per cent., but since 1884 to the present time it has fallen to 20 per cent. The operation is performed to prevent discharge into the abdominal cavity through the uterine sutures, and to avoid hemorrhage. It is an easier operation than the Säger, and recently has given such good results as to make it a question whether it is not more favorable.

Porro-Müller.—In this a long abdominal incision is made; the uterus is lifted out and then incised. The application of an Esmarch tube around the cervix to control hemorrhage was also a modification of Müller.

Säger.—The modifications of Säger have given an operation which is the most successful and the one to employ, except when certain conditions indicate the Porro-Cæsarean as preferable. The mortality with the best of German operators is 5 per cent. for mothers, and less for the children. In general it has now been reduced to 20 per cent.; for continental Europe to 12 per cent.; and there have been six consecutive operations in Philadelphia without a death. The main feature of Säger's discovery is the introduction of two rows of silk sutures to close the uterine incision, one through the uterine muscle down to the decidua (two to the inch), and the other superficial (Lembert

20180 *Hysterothylacina* n
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suture) to tuck in the peritoneal covering of the uterus which unites in twenty-four hours, and thus prevents leakage into peritoneal cavity. Another element of success is to be found in the fact that the operation is now undertaken in time, before forceps, version, embryotomy or other operations have been tried.

Indications.—Are relative and absolute.

(a) *Absolute.*—Some condition which admits of no other method of treatment.

1. Pelvic deformity. In flat pelvis when conjugata vera is 6.5 cm. ($2\frac{1}{2}$ inches) or less. It may be required in osteomalacia and spondylolisthesis, also in Nægele's and Roberts' pelvises.

2. New growths obstructing the pelvis, as a large fibroid, bony tumors of the sacrum, carcinoma, tumors of neighboring organs, etc. *atresia*.

(b) *Relative.*—When the condition admits of some other method of treatment: but the question arises whether Cæsarean section will not give the best result for mother and child, *i. e.*, it is selected as likely to give best results. The question should always be placed before the husband for his conclusion. Usually the family will decide in favor of craniotomy.

1. Pelvic deformity. Conjugate vera 6.5 cm. ($2\frac{1}{2}$ inches) to $8\frac{1}{3}$ cm. ($3\frac{1}{8}$ inches). When the conjugate measures $8\frac{1}{3}$ cm., the operation is indicated only when the child is abnormally large.

2. Rupture of the uterus may often require the Sänger or Porro operation.

The Porro operation is indicated when the pelvis is so choked up as to interfere with drainage of lochia; when the woman has been long in labor and is septic, or when other methods of treatment have been unsuccessful, and the danger of sepsis thus increased; when the uterus fails to contract, and hemorrhage is profuse; in cases of rupture of the uterus where the laceration is very extensive.

Technique of the Operation.—(Sänger, or improved Cæsarean.)

(a) *Time.*—The most favorable time is from 250th to 265th day after conception. The introduction of a bougie into the uterine cavity to institute labor pains is an advantage. The operation should be performed after labor has begun. There is not much danger of hemorrhage from inertia, however, in operating before labor has begun.

(b) *Instruments*.—Those ordinarily used in a laparotomy.

(c) *Preparatory Treatment*.—Includes disinfection of abdomen and external genitals, evacuation of bladder and bowels, etc. as for laparotomy.

(d) *Abdominal incision* should extend one-third above and two-thirds below umbilicus.

(e) *Esmarch tube* should be placed around cervix to control bleeding; or, better, the cervix should be grasped by an assistant.

(f) *The uterine incision* should be long enough to allow the escape of the child's head, and the child extracted, grasping it as may be most convenient.

(g) *The placenta is next extracted*, followed by the Säger method of suture to close the uterine wound (deep and superficial stitches). The abdominal wound is then closed after the toilet of the abdominal cavity has been completed, and the after-treatment combines the features of management after labor and laparotomy.

Laparo-elytrotomy.

In 1806 Jörg devised an operation which consisted of an incision over Poupart's ligament, dissecting up the peritoneum until the vagina is reached, when the latter is incised transversely, the cervix dilated, and the child thus extracted above the inlet. In 1820 this operation was performed by Ritgen, with a fatal result. In 1822 it was proposed by Physick, of Philadelphia, and in 1823 done by Baudelocque. In 1876, Thomas and Skene of New York performed it, and it was called by them laparo-elytrotomy. Since 1876 its mortality has been 50 per cent., and therefore it is not a justifiable procedure.

Cœlio-cystectomy.

An operation performed in advanced extra-uterine pregnancy for removal of fœtus and entire sac. It is performed like an abdominal section for any cystic tumor in the abdominal cavity with dense adhesions. The sac is to be evacuated or not, as indicated, and adhesions separated, if necessary, after ligation.

Abdominal Section for Obstetrical Complications.

1. Ruptured tubal pregnancy.
2. Ruptured uterus.
3. Cæsarean section.
4. Purulent peritonitis following septic infection.
5. Degenerative or inflammatory changes in tumors in or about the genitalia, the result of parturition.
6. Intraperitoneal hemorrhage.

Dystocia.

Causes :—

- A. Anomalies in force, expulsive or resistant.
- B. Accidents.
- C. Disease.

(A) Anomalies in Force.

I. In Expulsive Power of Uterus or Abdominal Muscles.

- (A) Excess of expulsive power.
- (B) Defect of expulsive power.

(A) EXCESS OF EXPULSIVE POWER.

(1) *Uterine*.—Excessive uterine contraction is rare. Occurs most frequently in primiparæ, and does not seem to be dependent upon the muscular development of the patient.

Diagnosis.—Abdominal palpation shows frequent and forcible uterine contraction. Vaginal examination shows rapid advance of presenting part. Cry of patient is exaggerated.

Difficulties.—The severe pain and precipitate expulsion of the child.

Treatment.—Anæsthetic. Resist advance of presenting part. In the earlier stages, if the pains be so frequent as to threaten exhaustion, lessen nerve action and muscular power by chloral, gr. xv every fifteen minutes until three doses are taken. Bromides or opium may also be used. Should excessive pains occur in an irritable woman, establish mental control over the patient.

(2) *Abdominal*.—Excessive abdominal power occurs in the second stage, and should be similarly treated.

(3) A *relative excess* occurs when the opposition is less, as in a roomy pelvis, a pelvis with straight sacrum, relaxed or lacerated perineum, fetus very small or premature. The dangers of rapid expulsion thus likely to follow are laceration of the perineum and cervix, syncope, post-partum hemorrhage, rupture of the cord, premature detachment of the placenta. When due to such a cause, treatment should supply resistance by holding the head back with the thumb or small, straight forceps.

(4) Excess occurs when there is a *gradual decrease of the intervals between the contractions*, until a final condition of tetanic spasm may result. This may be due to a serious obstruction, as deformity of pelvis, abnormal presentation, fibroids, cancer of cervix, ovarian tumor, agglutination of external os, etc., or there may be a true spasm of the uterus, as may develop in an irritable primipara with liquor amnii drained off.

Diagnosis.—By palpation above and below the contraction ring.

Treatment.—Remove the cause. If a true spasm, chloral and opium.

(B) DEFECT OF EXPULSIVE POWER.

Uterine Inertia—Causes.—(1) *Weakness of muscle*, as occurs sometimes in multiparæ, exhausted primiparæ, general diseases, as pneumonia, typhoid, phthisis, cancer, over-distention from twins or hydramnion.

(2) *Apathy of muscle*.

(3) *Emotion*.—Physician's presence, desire to empty bowels, excessive pain.

Dangers.—Relaxation predisposes to septic infection, pressure necroses, post-partum hemorrhage. The child may become asphyxiated by pressure on its brain centres or compression of the cord, and may develop an inspiration pneumonia.

Diagnosis.—Contractions are felt to be feeble, pains not complained of by patient, slow advance of presenting part.

Treatment.—In the majority of cases in the first stage, inaction; in the second stage, forceps. In the first stage, if due to

weakness or fatigue, stimulants, or quinine gr. xv ; if to apathy of muscle, lukewarm injections against the anterior wall of cervix, repeated every two hours, or introduce a bougie ; if to emotion, remove cause or possibly administer an anæsthetic. If it occurs early, and there should be an indication for speedy delivery, the membranes not ruptured, terminate the labor by rapid dilatation of cervix and version. Ergot should not be given, as it excites tetanic spasm and contracts the cervix. The fœtus is often semi-paralyzed, its blood supply partly shut off, and if an obstruction to labor exists, rupture of the uterus may follow its use. In the second stage, rise of temperature and other signs of exhaustion demand interference. It is always best to err on the safe side and terminate the labor.

Weakness of Abdominal Muscles.

Causes.—Fatigue ; inhibition by emotion, as excessive pain, faulty development.

Treatment.—Forceps usually.

II. Anomalies in Force of Resistance.

MATERNAL OBSTRUCTIONS.

1. *Contracted Pelvis.*

Treatment.—Differs with grade of deformity. *Conjugate* $9\frac{1}{2}$ to 11 cm.—Can allow to go to term, expecting the labor to be rather difficult and prolonged. Complications are frequent, as abnormal positions and presentations of child, which are four times as frequent as in normal pelves. Prolapse of cord is also a frequent complication. The most frequent abnormality is transverse situation of the head at pelvic inlet, as described under Abnormalities in the Mechanism of Vertex Presentations. Prolongation of labor and exaggerated complaints of patient must be expected. Increased expulsive powers are demanded, and if insufficient to secure engagement of the head in superior strait version must be resorted to. In primiparæ spontaneous termination is more frequent. In multiparæ or when muscular force is diminished assistance is often needed. When forces are normal and child not oversized, non-interference with nature's mechanism is the cardinal rule. Forceps interferes by preventing partial extension, favorable moulding, and lateral inclina-

tion, and should not therefore, as a rule, be applied until head has entered pelvic cavity, when it is not usually required unless inertia uteri develops. As a general rule it may be said that before engagement, the treatment is version or nothing ; if in doubt, version. After partial engagement, forceps only when the mother's safety indicates its employment. *Conjugate 8 to 9½ cm.*—Indicates induction of premature labor from two to four weeks before expected delivery depending upon degree of flattening. After labor has begun, the head in flat pelvis is apparently low down, from shallow depth of pelvis and low position of caput succedaneum, and this mistaken idea may induce one to apply forceps. In such a case, either non-interference or version and extraction are indicated—the former in primiparæ or in women with strong expulsive powers, the latter in multiparæ or in women with deficient expulsive powers. Forceps may be applied after the head has entered the pelvis. *Conjugate 6.5 to 8 cm.*—At term the alternatives are version, craniotomy, Cæsarean section (relative indication), and symphysiotomy. *Conjugate below 6.5 cm.*—Cæsarean section only. Accurate and precise diagnosis of the degree of deformity should always be made in order to spare the woman the dangers of futile attempts at extraction with forceps or by version when symphysiotomy, craniotomy or Cæsarean section is indicated. (See Craniotomy and Cæsarean Section.)

2. *Congenital Anomalies of Development in Genital Canal.*—As double uterus. May interfere by its bulk or contraction of the empty uterus. If placenta is attached to septum, alarming postpartum hemorrhage may occur.

3. *Closure and Contraction of Cervix.*—As *atresia*, *cicatricial contraction* or *rigidity*. *Atresia* is rarely complete, and may be overcome by pressure on the small opening with the tip of a sound or finger. *Cicatricial contraction* will often yield to Barnes' bags and version or application of forceps before engagement, but may require incisions, controlling the hemorrhage temporarily by clamped sutures. *Rigidity* usually yields to copious hot douches every 15 minutes against anterior lip of cervix. Chloral, an anæsthetic, morphia, belladonna ointment have been recommended. Incarceration of anterior lip be-

tween head and pelvis, with rapidly developing œdema, is common. It should be pushed back over the head with the fingers. In case of hypertrophy of anterior lip the obstruction may become quite serious.

4. *Closure and Contraction of Vagina or Vulva.*—As by constricting bands, cicatrization, hæmatomata, unruptured hymen, vagina emptying in rectum, vaginal tumors and cysts, cystic and solid tumors of the vulva, enlarged caruncula myrtiformis. The advancing head may rupture *constricting bands*; if necessary, incisions may be made and hemorrhage controlled by continuous catgut sutures. Dilatation with Barnes's bags and version or forceps may be employed. *Cicatrization* often requires Barnes's bags and version, forceps or incisions. It may even indicate Cæsarean section. For management of *hæmatomata* see page 76. Other obstructions in the vagina may be removed by dilatation, incisions or excisions (the last in case of solid tumors).

5. *Displacements of Uterus.*—Anterior, lateral, sacculation, partial prolapse with hypertrophic elongation of cervix. The first requires a binder, the second side position, with compress under fundus. Version or forceps to bring head into parturient canal for sacculation. Prolapse may occur suddenly in labor, and usually grows worse as parturition progresses. Attempts at reposition should be made, although they usually fail. Incisions with scissors, radiating from os for elongated cervix, when gradual dilatation cannot be accomplished.

6. *Tumors of Genital Canal.*—*Carcinoma of Cervix.*—If extensive or far advanced, may require Cæsarean section.

Fibroids.—If low down and diagnosed during pregnancy, remove by abdominal section, induce abortion or perform Cæsarean section at term. If movable, they may be pushed out of the way during labor.

Polypi.—Usually spring from cervix. Ligate base and remove at term.

7. *Tumors of Neighboring Organs.*—*Ovarian Cystoma.*—Usually cause abortion. Ovariectomy during pregnancy is justifiable. If they obstruct during labor, aspirate per vaginam. *Vaginal enterocele* should be reduced; *Fibro-cystic Tumor of Ovarian Liga-*

ment may require an abdominal section; *Displaced Kidney* may obstruct pelvic inlet, necessitating version; *Hydatid Cysts* of the pelvis may obstruct labor. *Cystocolpocoele* or *Rectocoele* should be replaced until the forceps are used to bring the head past them. *Calculi* or *faecal* masses should be removed. The following condition in and about the rectum may present a mechanical obstacle to delivery: Cancer; atresia ani vaginalis; foreign bodies; contraction of levatores ani; benignant tumors, such as cysts of the rectum and ovarian cysts, which have perforated the rectum.

A decomposed fœtus in utero, associated very likely with tympanitis uteri or physometra, as result of obstructed labor, should be removed antiseptically.

FŒTAL OBSTRUCTIONS.

1. *Overgrowth of Fœtus.*

Causes.—(a) Prolongation of pregnancy (probably most frequent, and should not be allowed to go beyond two weeks when a bougie may be introduced); (b) oversize and advanced age of one or both parents; (c) multiparity—the child is apt to increase in size in each successive pregnancy up to the fourth or fifth. This should be remembered in cases of contracted pelvis. The first two or three labors may be spontaneous, but later the oversize of the child and diminished muscular power of the mother may occasion dystocia.

2. *Malformations and Tumors.*—Treatment varies with each case. Version or embryotomy usually required.

3. *Diseases and Death of the Fœtus.*—As cystic kidneys, effusions into the serous cavities, anasarca, enlarged liver, distended bladder from atresia of urethra or vagina, hydrocephalus. These complications usually call for some mutilating operation. Hydrocephalus can be diagnosticated by digital examination and abdominal palpation, the wide-open fontanelles, the great width of the sutures, the fluctuation to be felt in these regions, the great size of the head, appreciated by bimanual examination and possibly the crepitation of the cranial bones, indicating the condition. Aseptic puncture and aspiration of the fluid are not necessarily fatal to the child. In head-last

cases, spinal canal, if necessary, can be opened and catheter passed to cranial cavity.

4. *Malpresentations and Faulty Positions*.—As shoulder, face, brow, compound (when two or more parts present at the same time, as head and hand, hand and foot, nuchal position of arm, etc.). *Treatment*.—Shoulder, face or brow as described under Mechanism of Labor. The treatment of compound presentations varies. Version is often required. Sometimes the hand can be pushed back and forceps applied. Nuchal position of arm may render its fracture justifiable to accomplish delivery.

5. *Multiple Births*.

Twins.—The following table gives the combined presentations in order of frequency :

Both heads presenting,	49 per cent.
Head and breech,	31.70
Both pelvic presentations,	8.60
Head and transverse,	6.18
Breech and transverse,	4.14
Both transverse,	0.35

They are of opposite sex in 37 per cent.; both boys in 34 per cent., and both girls in 28 per cent. In the large majority of cases the interval between the delivery of twins is less than an hour. A longer delay than this indicates the likelihood of some obstruction to birth of second infant. Operative interference of some kind is demanded in about one-quarter of all cases. If both engage, retard one and extract the other. The cord may be coiled around one. The chins may lock, when an effort should be made to push back the one presenting by the head. Failing, amputate the head of this one and deliver the one presenting by the breech, or push the latter back and deliver the former with forceps. In any case when one is born do not follow the expectant plan, as sometimes advised, but at once determine the position and presentation of the one remaining in the uterus. The second very often becomes transverse on account of the roominess of the uterus. Correct it, if necessary; give ergot and terminate the labor artificially only when the condition of the child or mother indicates it.

An extra-uterine fœtus may obstruct the delivery of the intra-uterine twin.

6. *Rigor mortis* in the fœtus may obstruct labor.

7. *Abnormalities in Fœtal Appendages.*

Membranes.—If too thin, an early rupture precedes a dry labor with irritable uterus; if too thick, child apt to be born with a “caul.” *Liquor Amnii.*—If too little, consequences are similar to those of premature rupture; if too much, there is inertia, as result of over-stretching.

Cord.—If short, may cause premature detachment of placenta or prevent advance of the child. In the former there is exaggerated maternal pain at the placental site and marked recession of the head after each pain. The diagnosis is always difficult. Forceps should be applied if the presentation is cephalic. If too long, prolapse is apt to occur.

Placenta.—May be adherent, from syphilis or endometritis during pregnancy. The alarming hemorrhage resulting requires removal of the adherent portion. It may be retained in the lower uterine segment. The placenta may be prævia.

(B) Dystocia due to Accidents to Child or Mother.

(a) ACCIDENTS TO THE CHILD.—1. *Prolapse of Cord.*—Causes: Lack of conformity of presenting part with shape and size of pelvis, as small head, malpresentations (face, shoulder, breech), contracted pelvis. Less commonly hydramnios, too long a cord, lateral deviation of uterus. It frequently occurs in placenta prævia and marginal insertion of the cord.

Diagnosis.—Easy. Has been mistaken for prolapse of intestines.

Prognosis.—Mortality 53 per cent.

Treatment.—Postural and manual, *i. e.*, knee-chest posture, and endeavor to replace with fingers. Instrumental, a catheter with counter-opening used as repositor. If these fail, resort to version, or, although it more often fails, rapid extraction with forceps, placing the cord at the sacro-iliac joint, where it would be least pressed upon.

2. *Rupture of Cord.*—Rare. Usually causes death of the infant. Occurs most often when there is a velementous insertion.

When the cord is normal it is usually seen in a precipitate labor, or when the cord is coiled around the neck.

3. *Avulsion of the Extremities and Decapitation*.—The first in premature infants, the second, by too much force in attempts to extract the after-coming head.

(b) ACCIDENTS TO THE MOTHER.—*Hemorrhage* occurring before, during, or after labor. Ante-partum hemorrhage may be due to placenta prævia, or premature detachment of placenta; intra-partum hemorrhage is caused by rupture of the uterus, lacerations of the lower birth canal, or separation of the placenta; post-partum bleeding results from relaxation of the uterus or injuries to the birth canal.

(1) *Placenta Prævia*.—The placenta is said to be prævia when it is attached to any portion of the lower uterine segment. Occurs 1 in 1200. Hemorrhage from placenta prævia is sometimes called *unavoidable* hemorrhage.

Causes.—It is said to be the result of a low situation of the ovum; but why this occurs is not yet satisfactorily explained. Growth of the decidua reflexa downward, due perhaps to pre-existing endometritis, has been offered as an explanation. It is more frequent in multiparæ and those of the poorer class.

Varieties.—Central, Partial, Marginal, Lateral.

Symptoms.—Hemorrhage, occurring as early as the second month in the central variety, during labor or not at all in the lateral. The characteristics of the hemorrhage are, sudden onset without pain, the patient often finding a gush of blood while in bed, and return of the bleeding, with progressively increasing quantity at decreasing intervals. Vaginal examination finds the os more patulous, situated lower, the cervical vessels pulsating, the cervix larger than common, and the characteristic feel of the maternal surface of the placenta can be felt through the patulous cervical canal. Rarely, the hemorrhage is controlled by nature, a clot forming or syncope occurring, and a fatal hemorrhage before the 7th month has very rarely been recorded.

Treatment.—Prior to 7th month, usually expectant. It may, in exceptional cases, be necessary to induce abortion in the early months on account of profuse and continuous

hemorrhage. After 7th month, *induction of premature labor* by forced dilatation of cervix and combined version. Tampon vagina until an assistant is secured to administer anæsthetic. The breech should be brought down until the knee is born, as it controls the hemorrhage and does not cut off the blood-supply to the fœtus. Use the right hand internally, as the smallest segment of the placenta is usually on the left side.

In the central variety perforate the placenta if necessary. In the marginal, if the hemorrhage is not alarming, forceps may be applied to the head.

Wiegand's treatment is a large antiseptic tampon placed in the upper third of the vagina, allowing the head to push it out. This treatment sacrifices the life of the child usually, but may be resorted to if the obstetrician does not feel equal to a rapid version. Separation of the placenta by a sweep of the finger is advised by some authors. It may be used, particularly when the tampon is employed. The child usually perishes.

Incubation and gavage should be used if the child is born early after 7th month.

Prognosis.—Good in skilful hands; 33 to 40 per cent. mortality in general practice. Situation of placental site and lowered resistance of body cells favor sepsis; post-partum hemorrhage may occur from relaxation of lower uterine segment and feeble uterine contraction.

(2) *Accidental Hemorrhage.*—Hemorrhage from premature detachment of the placenta: a rare complication. Occurs about once in one thousand labors. It is frank or concealed. The latter may be one of four classes: —

1. Centre of placenta detached.
 2. Upper margin detached and blood extravasated between membranes and uterus.
 3. Membranes rupture and blood passes into amniotic cavity.
 4. Cervix obstructed by clot, membranes, or presenting part.
- The concealed variety is less frequent. In the frank the lower portion of the placenta is frequently detached and hemorrhage is not profuse.

Causes.—Obscure. Similar to those of abortion, as decidual apoplexy from kidney disease and congestion of pelvic vis-

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cera, injury or violence, violent exercise, emotion, etc. Prolongation of pregnancy is a common cause. It is often associated with irregular uterine contraction, and has sometimes resulted from a kick or blow on the abdomen. Occurs more frequently in the latter months of pregnancy and in multiparæ.

Diagnosis.—To save life should be made early. The accident usually occurs in the first stage of labor. The uterine pains become weak and finally cease, being replaced by persistent and severe pain at the placental site; the signs of internal hemorrhage become more and more apparent, the uterus meanwhile grows larger and relaxed by the accumulated blood in its cavity. Feeble and persistent contraction of the upper portion of the uterus may be felt. The symptoms are similar to rupture of uterus. There is hemorrhage, with, perhaps, sudden excruciating pain and shock in both, but in rupture of the uterus the membranes are broken, the presenting part recedes, the uterus is well contracted, while in accidental hemorrhage the membranes are not always broken, the presenting part does not recede, and the uterus is distended by the accumulated blood, particularly in the concealed variety. When there is a retroplacental effusion a localized bulging at the placental attachment can be made out by abdominal palpation. In exceptional cases of frank accidental hemorrhage the bleeding begins in pregnancy and continues uninterruptedly for weeks, a large blood-clot gradually forming between the site of placental separation and the external os. This mass of blood soon begins to decompose and septic symptoms supervene. In spite of the unfavorable conditions, pregnancy continues and the fœtus lives.

Prognosis.—Grave. Fifty-four deaths in 107 cases; of 108 children only 7 were saved.

Treatment.—Perforate membranes, thus securing some control of hemorrhage by the contraction of uterus, followed by forced dilatation of cervix, version, and extraction when the head is not engaged. When the head is engaged and small, rapid forceps delivery; when large or pelvis small and soft parts rigid, craniotomy. Not more than ten minutes should be con-

sumed in effecting delivery. Post-partum hemorrhage is apt to occur.

(3) *Post-partum Hemorrhage*.—Nature's mechanism of preventing hemorrhage:

1. Leucocytes begin to block up the sinuses in the latter months of pregnancy, and the excess of fibrin in the blood during pregnancy together with the sluggish circulation in the uterine sinuses favor clotting.

2. Contraction.

3. Retraction.

Causes :—

1. *Those which interfere with contraction*, as (a) weakness from general disease, bad hygiene, mental anxiety; (b) muscle fibre at fault, as when undeveloped, fatigued, overstretched, or inactive by reason of surrounding inflammatory products; (c) anomalies in innervation of muscle fibre; (d) mechanical—as retained placenta, clots, old adhesions, tumors, as fibroids, ovarian cysts, distended bladder or rectum.

Symptoms.—Sudden gush of blood, or four or five ounces lost every few seconds. Uterus relaxed. Constitutional signs of severe hemorrhage, as vertigo, air hunger, pallor, etc. In exceptional cases one tremendous outpour of blood, lasting not more than five minutes, kills the patient.

Treatment.—(a) *Prophylactic*.—When there is any probability of its occurrence, as soon as head is born inject into thigh a syringeful of ergot, properly manipulate uterus, and apply binder.

(b) *Curative*.—Always have in readiness, water 112°–120°, empty basin, vinegar, ice broken size of fist, clean handkerchief, hypodermic syringe, ergot, intrauterine tampon of iodoform gauze.

The indications are: 1. Control the hemorrhage; and 2, treat the after-condition.

The first indication is met by the following in the order given :—

(a) External stimulation of uterus.

(b) Carry the other hand into the uterus and remove any clots, placenta, etc.

At the first
of the year 1871 the
company was organized
and the first year was
successful.

The first year was successful.

(c) Ice applied internally and externally, but not persisted in. Ether poured upon lower abdomen will usually evoke uterine contraction.

(d) Handkerchief soaked in vinegar squeezed at the fundus.

(e) Hot water.

(f) Electricity.,

(g) *Intrauterine* tampon of iodoform gauze.

(h) Drugs, as iodine, turpentine, styptic salts of iron, etc., are dangerous, as the coagula produced by them may extend into the vessels, are firm and must be broken up by putrefaction, exposing the patient to septic poisoning. They are only to be used when everything else fails. The two first named are the least dangerous, and are sometimes very effective. The bleeding can sometimes be controlled temporarily by compressing the posterior lip of the cervix against the symphysis and manipulating the fundus externally.

Treatment of the After-condition.—While controlling the hemorrhage, nurse should administer hypodermic of ether, raise the foot of the bed, and remove pillow from under patient's head. When the bleeding has ceased administer an enema of hot water with a little salt in it, and frequently repeated small doses of hot, strong coffee, milk, hot water and brandy, and surround the patient with hot bottles and cover with thick blankets. Auto-transfusion by bandaging extremities, compressing abdominal aorta, or actual transfusion into a vein or the subcutaneous connective tissue between the scapulæ (8 oz. of $\frac{6}{100}$ of 1 per cent. of ordinary NaCl solution—about 40 grs. to the pint). When reaction is established, a hypodermic of morphia may be given. Very rarely, indeed, an uncontrollable post-partum hemorrhage is seen from a firmly contracted uterus (once from rupture of aneurismal vessel; once in nephritis, presumably from atheromatous vessels).

(4) *Hemorrhage from Injuries of Lower Parturient Tract.*—Exceptionally may be fatal. The most common source is in the anterior wall of vagina near the urethra, where it should be controlled by antiseptic catgut or silk ligature. Exceptionally an anomalous artery may be torn in the cervix or perineum requiring immediate operation. If in the cervix, ligate or pass

suture under the bleeding point; if in vagina, tampon and apply continuous suture from below upward.

(5) *Rupture of Uterus.*

Cause.—Serious obstruction to labor or external violence.

Frequency.—One in 4000 cases.

Morbid Anatomy.—Rent usually begins in lower uterine segment, and is transverse, but may extend perpendicularly up to and over the fundus. It usually involves all the coats of the uterus and opens a way into the peritoneal cavity, but it may involve the mucous and muscular without the peritoneal covering, or very rarely the peritoneal and muscular, but not the mucous, or, perhaps, the peritoneal coat alone.

Diagnosis.—Placenta Prævia, Accidental Hemorrhage, Rupture of Uterus are the three causes of grave ante- or intra-partum hemorrhage. In the last there is shock, violent pain, great alarm on the part of the patient, the membranes are broken, the presenting part recedes, the contractions cease, the examining hand finds the rent, and perhaps feels coils of intestines. The child may be felt in the abdominal cavity with the uterus small and firmly contracted. The danger signal is thinning of the lower uterine segment and a high position of the contraction ring. The seat of rupture is usually in the lower segment.

Prognosis.—Mortality in general practice, 90 per cent. Statistics from the experience of experts gives the following: 60 cases of complete rupture without active treatment, mortality 78.8 per cent.; 70 cases treated by irrigation and drainage, mortality 64 per cent.; 193 cases treated by abdominal section, mortality 55.3 per cent.

Treatment.—Varies with the cause. Err on the side of the mother's safety. Deliver by podalic version if not engaged; forceps or craniotomy after engagement. If the rent is small and situated low down, the hemorrhage ceases and there are no clots nor meconium in the peritoneal cavity, and if there is good drainage, no active treatment required beyond irrigation with $\frac{1}{2}$ per cent. solution of creolin. Drainage can be secured by using a double tube passed through the rent into the peritoneal cavity, or by an iodoform gauze tampon. When the rent is

Usually in the wall

usually in the wall
usually in the wall
usually in the wall

large, hemorrhage profuse, and the child is in the abdominal cavity, open abdomen and suture after the Säger method, or amputate the uterus after apply a secure nœud.

It is believed that rupture of the anterior wall is more dangerous than rupture of the posterior wall, because the drainage is not so good. During the puerperium the uterus may rupture as a result of septic ulceration, pressure necroses, or more rarely from malignant cystic degeneration of the chorion. In such cases the prognosis is graver than in rupture during labor. Laparotomy is always required, and amputation of the uterus is usually necessary.

(6) *Lacerations of Cervix, Vagina, and Pelvic Floor.*—Already referred to in minor grades. Vagina may be ruptured into rectum without involvement of perineum, or at the vault into the peritoneal cavity. The base of the broad ligament may be exposed and the uterus injured.

(7) *Inversion of the Uterus.*—The rarest of all accidents to the mother, and happens before or after delivery of the placenta with equal frequency. It may be partial or complete.

Causes.—It may arise spontaneously in the so-called paralysis of the placental site, or it may be due to too vigorous traction on the cord, compression of the fundus, or may occur after separation of adherent placenta.

Symptoms.—Occurs suddenly and is usually associated with shock and hemorrhage. Physical examination per rectum reveals a cup-like body containing, perhaps, the prolapsed tubes and ovaries, or by rectal and abdominal touch a transverse slit may be felt at the margin of the inversion. The fundus cannot be felt through abdominal wall. Sound or finger not will pass between tumor and contracting cervix, as would be the case were the tumor a polypus. It has been mistaken for a polypoid tumor and the inverted womb torn or cut away.

Treatment.—Occasionally spontaneous reduction occurs, particularly when the inversion is partial. Remove the placenta if still adherent and reduce by pressing the fundus with the finger tips in the direction of the axis of the superior strait, *i. e.*, upward and forward to pass the sacral promontory. Sometimes

complete reduction cannot be accomplished until the end of the puerperium.

(8) *Other accidents to the mother are Rupture of Symphysis, requiring a binder or plaster bandage; Separation of Sacro-iliac Joints, and Fracture of Pelvic Bones by Faulty Use of Forceps; Fracture of Sacro-coccygeal Joint; Lacerations and Perforations with Instruments; Diastasis of Abdominal Muscles; Rupture of some part of the Respiratory Tract and Subcutaneous Emphysema.* The last is not dangerous if of larynx and trachea, with emphysema only of neck and face and not of the whole trunk. Much more dangerous if of pulmonary vesicles with emphysema of subpleural and interlobar connective tissue, and consequent embarrassment of heart and lungs.

(C) Dystocia due to Disease.

1. *Convulsions.*—*Definition.*—Muscular spasms with or without unconsciousness, occurring during pregnancy, parturition, or the puerperium. *Causes.*—Eclampsia, hysteria, epilepsy, tumors of the brain, meningitis, profound anæmia following post-partum hemorrhage, apoplexy; or there may be present that curious nervous condition during and after labor, so easily responding to reflex disturbances, in which the convulsions may arise from some trifling irritation, as that of an overdistended bladder, the introduction of the hand in performing version, the pressure of the head upon the perineum, exaggerated after-pains.

Eclampsia.—Is the name given to the most frequent variety of convulsions in the child-bearing woman, the result of kidney insufficiency.

Causes.—Obscure. Theories of causation: (a) Urea. (b) Carbonate of Ammonium. (c) Urinæmia. (d) Trauber-Rosenstein. (e) Prof. Hirst approves the following: Anæmia in the deeper portions and congestion of the surface of the brain, due to the sudden rise of arterial pressure resulting from the accumulation of poisons in the mother's blood (probably leucomaines generated in the fetal body), her kidneys being unable to excrete them. Excretion may become insufficient by the development of kidney of pregnancy, of nephritis, or by pressure upon the ureters.

The kidney may be diseased and yet functionally sufficient, or healthy, anatomically, but functionally insufficient.

Frequency.—Occurs once in three hundred cases; most frequently in primiparæ, and during labor; least frequently during the puerperium. It develops with greater frequency in multiple pregnancies and is said to occur as an endemic, *i. e.*, connected with climatic changes.

Symptoms.—(a) *Prodromal.*—Sharp pain is sometimes felt in the head, epigastrium or under clavicle; muscæ volitantes with failure of vision and rolling of the head.

(b) *Of the Attack.*—A few moments after the above the attack comes on with a stare, pupils at first contract, eyelids twitch, eyeballs roll, mouth pulled to one side, the neck is then affected, and the spasm finally spreads to trunk and upper extremities. The lower part of lower extremities is rarely spasmodically affected. Consciousness is lost for a minute or two, and during the varying intervals between the attacks there is a progressively deepening stupor. The temperature usually rises steadily with each successive fit.

Differential Diagnosis.—In eclampsia there may be a history of albuminuria, œdema, etc. The patient catheterized and urine heated in a spoon over gas or lamp flame will always show coagulation after one or two convulsions. (It should be remembered that in about 16 per cent. of cases albuminuria has not been present before the convulsive attack.) The temperature is elevated and unconsciousness more or less profound.

Prognosis.—30 per cent. die. Influenced by the violence and frequency of the attacks, the character of the pulse, degree of coma, and perhaps the height of temperature. The cause of death may be any of the following: (Edema of brain, lungs or larynx, apoplexy, asphyxia, exhaustion, heart failure, overwhelming accumulation of the poison. Mortality of the child, 50 per cent.

Treatment.—(a) *Preventive.*—The urine of all pregnant women should be critically examined. If there be evidences of nephritis or the kidney of pregnancy, a restricted diet consisting largely of milk should be advised. Colds should be avoided, diuretics administered, and cathartics to prevent constipation. If the

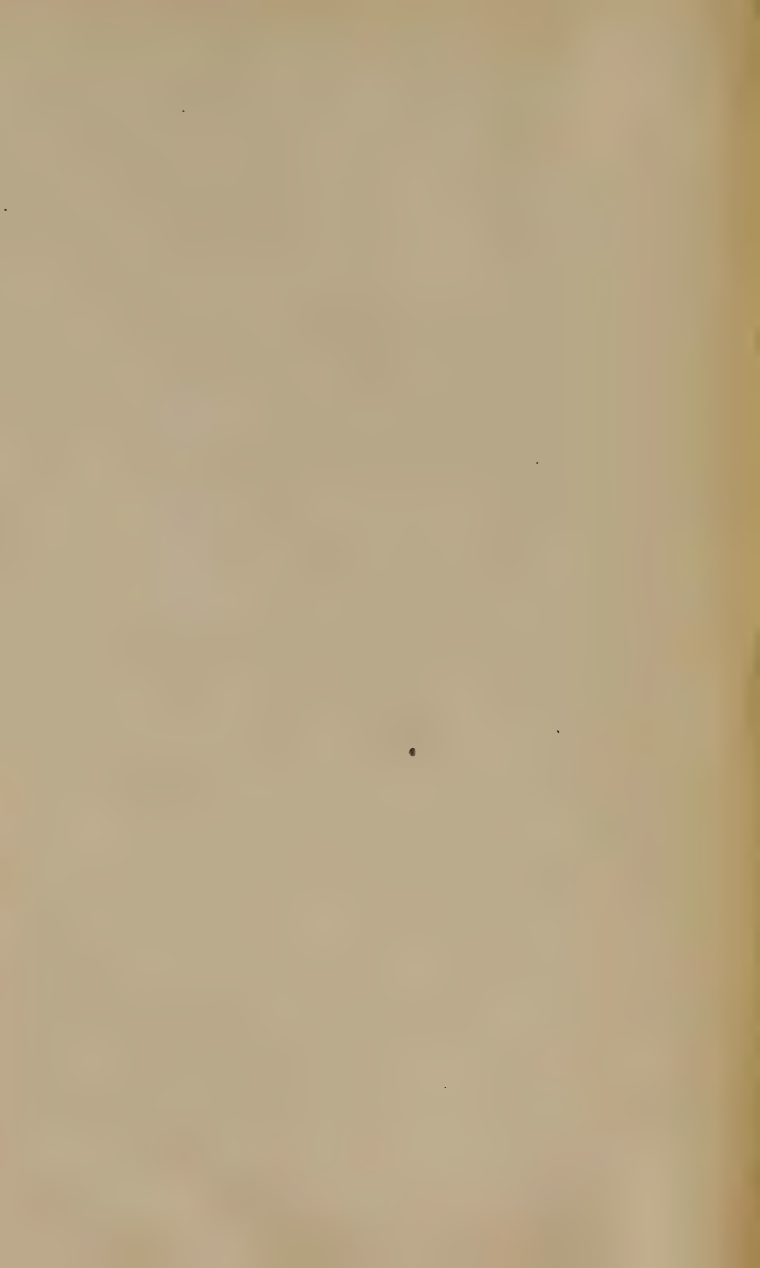
symptoms fail to respond to this treatment, the induction of premature labor should be considered.

(b) *Curative*.—Indications are to eliminate the poison and combat the spasm. Includes the *treatment of the spasm*, the *treatment during the intervals*, and the *obstetric treatment*. At the approach of and during the spasms, inhalations of chloroform. In the interval between the convulsions, venesection in strong plethoric cases, 24 to 30 ounces; croton oil, two or three drops in a little sweet oil, glycerine, or butter (elaterium may be used); an enema containing chloral $\mathfrak{z}\text{j}$, repeated three to six times in twenty-four hours if necessary; hot bath 100° or more, with ice or cold cloths to the head, or, what is more practicable in private practice, a hot wet pack; veratrum viride gtt. xv of the fluid extract hypodermatically, repeated in doses of five drops as often as may be necessary to keep the pulse at sixty. In twenty-four cases in which veratrum viride was used the mortality was sixteen per cent. Guard the patient from injury, especially the tongue, which may be protected by placing between the teeth a brush handle wrapped in a handkerchief. For the coma succeeding the convulsions administer concentrated saline solution $\mathfrak{z}\text{ij}$ every fifteen minutes until free catharsis is produced. Morphia and pilocarpin should not be employed. Nitrite of amyl is not in very great favor on account of the danger of post-partum hemorrhage.

(c) *Obstetric Treatment*.—During labor if the os is dilated, terminate the labor with forceps or by version. If the convulsions occur early, and the os is not dilated, wait until partial dilatation occurs, and complete the delivery by combined version and extraction if the head is not engaged. If the head is fixed in the pelvis, use forceps. During pregnancy do not attempt a forced delivery unless the case resists ordinary treatment and becomes desperate, or unless it is highly important that the child should be born alive. Cæsarean section has been done for eclampsia 11 times with 4 deaths. This treatment can scarcely ever be justifiable.

2. *Shock*.—Lowered temperature, leaking skin, running rapid pulse, and other symptoms of shock may develop after labor.





Cases of shock have been reported, said to be due to compression of the ovaries, when Credé's method of expressing the placenta has been employed.

3. *Typhoid*.—Rare. Premature labor occurs in 65 per cent. of cases. Labor unfavorably influences the disease, often causing profound shock after delivery. Active stimulation should be employed during labor, and forceps used in the second stage.

4. *Pneumonia or other Adynamic Diseases*.—Require stimulants. Whiskey, digitalis, carbonate of ammonium administered in the first stage, and labor terminated in the second.

5. *Valvular Defect in Heart*.—Extensive mitral disease frequently causes death; mortality 53 per cent. The heart is embarrassed during pregnancy or labor, and manifests its weakness directly after the expulsion of the child or placenta. When the discharge of blood is profuse, cardiac failure is rare in these cases, thus indicating the treatment: Venesection, removing 8–16 oz., if there is not much blood lost after labor. Nitrite of amyl directly after labor has given very good results. Digitalis should be given in the first stage, and forceps or extraction by the feet (in breech cases) resorted to in the second.

Sudden Death during or directly after Labor.

Causes.—1. *Profound Mental Impressions*, as sudden joy, grief, fear, exaggerated shame, excessive pain.

2. *Shock*.

3. *Heart Failure*.—It may be due to advanced kidney disease, fatty degeneration, fibroid patch, rupture of aneurism, myocarditis, etc. So small a matter as an intrauterine injection has caused death in these cases.

4. *Accidents of Labor*, as accidental, unavoidable, or post-partum hemorrhage, rupture or inversion of uterus.

5. *Rupture of Hæmatoma*, externally or internally.

6. *Syncope*.—This is not usually fatal. It is favored by the determination of blood from the brain, as by hemorrhage. Thromboses in the heart may form, and those in the uterine sinuses may be prolonged and embolism result. Prolonged syncope, associated with air hunger and other symptoms of profuse internal hemorrhage, is almost always fatal.

7. *Embolism and Thrombosis, especially of Pulmonary Artery*.—

May be the result of syncope, or it may possibly be caused by entrance of air. Embolus of fat from pelvic connective tissue has occurred.

Symptoms.—Sudden shock, heart failure, rapid respiration, air hunger, followed usually by death, although not invariably fatal.

8. *Rupture of Gastric Ulcer.*

9. *Acute Purpura Hæmorrhagica.*

10. *Rupture of Peritoneal Adhesions.*

11. *Rupture of Aorta.*

12. *Rupture of Cyst in Auricular Septum.*

13. *Angina Pectoris.*

Effect of Maternal Death upon the Fœtus.—The fœtus survives rarely more than a few minutes. It has lived for two hours.

When making an autopsy on a parturient woman, it is convenient to split the symphysis and remove the genital tract in one piece.

Post-mortem Delivery.—Accumulated gases have caused delivery of fœtus, giving rise to the suspicion of burial before death.

INDEX.

- ABDOMEN**, appearance of in pregnancy, 110
- Abdominal muscles**, action of in labor, 164
- palpation, 162
- plates, 24
- Abortion**, after treatment of, 141
- causes of, 138
- complete, 140
- diagnosis of, 140
- ergot in, use of, 141
- hemorrhage in, 140
- in cardiac diseases, 132
- in chorea, 130
- incomplete, results and treatment of, 141
- induction of, indications for, 176
- method of, 177
- inevitable, 139
- in retro displacements, 119
- in vomiting of pregnancy, 125
- membranes in, retention of, 141
- missed, 141
- mortality of, 139
- opium in, use of, 140
- prognosis of, 140
- prophylaxis of, 140
- symptoms of, 139
- tampon in, 141
- threatened, treatment of, 140
- treatment of, 140
- Abscess in mastitis**, 80
- ischio-rectal, 94
- Accidental hemorrhage**, 202
- Accouchement force**, 178
- After-coming head**, extraction of, 185
- After-pains**, 156
- Agalactia**, 78
- Albuminuria in eclampsia**, 209
- in pregnancy, 126, 129
- treatment of, 127
- Alimentary canal**, diseases of, during pregnancy, 123
- Alimentation**, rectal, in hyperemesis, 124
- Allantois**, 30
- Amnion**, 26
- abnormalities of, 27
- development of, 26
- false, 26
- fluid of, 26
- true, 26
- Amputation**, intrauterine, 28
- Anæmia cerebral**, causing eclampsia, 208
- pernicious, in pregnancy, 134
- puerperal, 74
- Anæsthetics in eclampsia**, 210
- in labor, 152
- Anomalies of breasts**, 77
- of pelvis. (*Vide Pelvis*, deformities of.)
- of soft parts, 105
- Ante-flexion in pregnancy**, 118
- Antisepsis**, 106
- in hospital practice, 108
- in private practice, 109
- reduction of mortality by, 108
- Antiseptics**, table of comparative power, 107
- Aphthæ**, 65
- Armamentarium of obstetrician**, 152
- Arms**, liberation of, in head-last labors, 186
- Artificial feeding**, 52
- respiration, 60
- risks attending, 61
- Asphyxia**, causes of, 59
- livida, symptoms of, 60
- pallida, symptoms of, 60
- treatment of, 60
- Atelectasis**, 61
- Auscultation in pregnancy**, 112

- Average date of conception after marriage, 24
- B**ACTERIA in lochia, 155
 Balottement, 112
 Barnes' bags in dilatation of cervix, 178
 Bed, preparation for labor, 108
 Bladder, calculus in, 128
 diseases of, in pregnancy, 128
 diseases of, in puerperium, 81
 irritability of, in pregnancy, 128
 Blastodermic vesicle, 23
 Blastospore, 23
 Bleeding from genitalia during pregnancy, 122
 from genitalia of female infants, 71
 Blindness in pregnancy, 131
 Blood, changes of, in pregnancy, 116
 discharge of, from genitalia, 122
 of female children, 71
 diseases of, in pregnancy, 134
 of newborn infants, 46
 Braxton Hicks' sign of pregnancy, 111
 Breasts, anomalies of, 77
 care of, during pregnancy, 79
 during puerperium, 159
 diseases of, during pregnancy, 123
 during puerperium, 79
 in newborn infant, 64
 Breech, extraction of, 182
 presentations, 172
 Brow presentations, 171
 Buhl's disease, 70
- C**ÆSAREAN section, 189
 indications, 191
 Porro, 190
 Porro-Müller, 190
 Sänger, 190
 Caput succedaneum, 57
 Cardiac diseases complicating pregnancy, 132
 Caul, 200
 Cavity of pelvis, axis of, 98
 diameters of, 98
 Cephalo-hæmatoma, 57
 Cervix, changes of, in pregnancy, 112, 115
 diseases of, in pregnancy, 121
 rigidity of treatment of, 196
 Changes in maternal organism in pregnancy, 113
 Child. (*Vide* Newborn Infant.)
 Chorea complicating pregnancy, 130
 Chorion, 28
 anomalies of, 29
 definition of, 28
 development of, 28
 diseases of, 29
 Circulation, affections of, in pregnancy, 132
 foetal, 36
 Cleft-palate, 64
 Colic of newborn infant, 66
 Colostrum, 158
 corpuscles, return of, 51
 Condensed milk, 55
 Confinement, prediction of date of, 113
 Congenital heart affections, 68
 Constipation in pregnancy, 125
 Convulsions, puerperal, 208
 Cord, abnormalities of, 30
 care of, after labor, 154
 coiling of, 31
 constituents of, 30
 development of, 30
 hemorrhage from, 69
 insertion of, 30
 prolapse of, 200
 rupture of, 200
 shortness of, 200
 Corpus luteum, formation of, 20
 spurium, 20
 verum, 20
 Cows' milk, 52
 Craniotomy, 188
 indications for, 188
 method of performing, 188
 Credé's method of placental expression, 134
 Curette in abortion, 141
 Cystitis, 81
- D**EATH, maternal, effect of, upon
 fœtus, 212
 of fœtus, signs of, 42
 sudden, during or directly after labor, 211
 of apparently well children, 71

- Decapitation, 188
- Decidua, development of, 31
 diseases of, 32
 reflexa, 32
 serotina, 32
 vera, 32
- Deformities, congenital, treatment of, 64
 pelvic, 100
- Delirium of labor, 132
- Development of amnion, 26
 of chorion, 29
 of deciduæ, 31
 of embryo, 24
 of placenta, 33
 of umbilical cord, 30
- Diameters of fetal head, 105
 of pelvis, 98, 102
- Diet in puerperium, 159, 160
 in renal insufficiency, 128
 Digestion in the newborn, 45
- Dilator, Barnes', in premature labor, 178
 Hegar's in abortion, 177
- Directions to nurse, 160
- Diseases - complicating pregnancy, 118
- Displacements of uterus. (*Vide Uterus.*)
- Dorsal plates, 24
- Douche, uterine, in abortion, 141
 hot, in post-partum hemorrhage, 205
 vaginal, after labor, 97
- Dry labor, 200
- Ductus arteriosus, 36
 venosus, 36
- Duration of pregnancy, 150
 estimation of, 113
- Dystocia, 193
 from accidents to child or mother, 200
 from disease, 208
 from fetal obstructions, 198
 from maternal obstructions, 195
- ECLAMPSIA**, 208
 diagnosis of, 209
 etiology of, 208
 prognosis of, 209
 treatment of, curative, 210
 obstetric, 210
 prophylactic, 209
- Ectopic gestation, 141
- Electricity,
 in asphyxia of newborn, 60
 in extra-uterine pregnancy, 149
 in post-partum hemorrhage, 205
- Embryo, development of, in different months of pregnancy, 24
- Embryotomy, 187
- Epilepsy complicating pregnancy, 131
- Episiotomy, 153
- Ergot, contra-indications in labor, 195
 in abortion, 141
 in post-partum hemorrhage, 204
- Erythema, infectious, 93
- Ether in labor, 152
- Evisceration, 189
- Evolution, spontaneous, 175
- Excessive uterine contraction, 193
- Expression of placenta, Credé's, 154
- External genitalia, changes of, in pregnancy, 102
 version, 184
- Extra-uterine pregnancy, 141
 causes of, 142
 classification of, 142
 clinical history of, 143
 diagnosis of, 148
 frequency of, 141
 prognosis, 148
 symptoms of, 147
 terminations of, 145
 treatment of, 148
- F**ACE presentations, 169
 forceps in, 171
 management of, 170
 mechanism of, 170
 version in, 171
- Feeding, artificial, of infants, 52
 natural, of infants, 49, 161
- Fertilization, 23
 mechanism of, 23
 most likely time of, 22, 23
- Fever, infectious, in pregnancy, 135
 of puerperium, 83
 non-infectious, of puerperium, 95
 puerperal, 83
 causes of, 83
 peculiar manifestations of septic, 92

- Fever, prognosis of, 92**
 symptoms of, 89
 treatment of, 90
 general, 91
 local, 90
 preventive, of infectious, 95
 specific in newborn, 64
 typhoid, in pregnancy, 136
- Fibroid tumors complicating labor, 197**
- Fissure of nipple, 79**
- Fœtal appendages, 29**
 in twin pregnancies, 37
 circulation, 36
 head, diameters of, 105
 palpation of, 105
 heart sounds, 112
 movements, 111
- Fœtometry, 105**
- Fœtus, causes of presentation of, 163**
 circulation of, 36
 death of, 44
 causes of, habitual, 44
 changes in structure after, 42
 diagnosis of, 42
 deformities of, 38
 development of, 24
 diseases of, in utero, 33-44
 dystocia, due to, 198
 estimation of size of, 105
 excretions of, 36
 lengths of, during pregnancy, 26
 maternal conditions affecting, 41
 monstrosities of, 38
 overgrowth of, 198
 pathology of, 38
 physiology of, 36
 syphilis of, 42
 viability of, 176
 weight of, at term, 26
- Force, anomalies of uterine and abdominal, 193**
- Forces involved in mechanism of labor, 163**
- Forceps, anæsthetic in application of, 182**
 application of, 181
 contra-indications to use of, 179
 in breech presentations, 128
- Forceps, in brow presentations, 172**
 indications for use of, 179
 in deformed pelvis, 180
 in face and brow presentations, 172
 in head-last labors, 187
 preliminaries to use of, 182
 traction with, 181
- Fractures, of newborn, 58**
- GALACTOCELE, 81**
 Galactorrhœa, 78
- Gavage, 48**
- Germinal spot, 19**
 vesicle, 19
- Gingivitis, 123**
- Goitre in pregnancy, 133**
- Graafian follicle, 19**
- Gravid uterus, displacements of, 118**
- HÆMATOMA, 76**
 Hæmoptysis in pregnancy, 135
- Hand, selection of, for podalic version, 185**
- Hare-lip, 64**
- Head, fœtal, 98, 164**
 after coming, extraction of, 185
 caput succedaneum of, 57
 cephalo-hæmatoma of, 57
 diameters of, 105
 distortion of, 57
 sinking of, into pelvis, 151
- Heart, diseases of, complicating labor, 211**
 pregnancy, 132
 sounds, fœtal, 112
- Hegar's sign of pregnancy, 112**
- Hemophilia, 67**
- Hemorrhage, accidental, 202**
 concealed, 202
 frank, 202
 from injuries of lower parturient tract, 205
 in abortion, 140
 in placenta prævia, 201
 post-partum, 204
 after-treatment of, 205
 causes of, 204
 treatment of, 204
 puerperal, 75
 umbilical, 69
 unavoidable, 201

Hemorrhoids of bladder, 128
 of pregnancy, 126
 Hernia, of gravid womb, 120
 umbilical, 64
 Herpes gestationis, 136
 Hydramnios, 27
 Hydrocephalus, 198
 management of labor complicated by, 198
 Hydronephrosis, 128
 Hydrorrhœa gravidarum, 32
 Hyperemesis in pregnancy, 124
 causes of, 124
 Hyperemesis, treatment of, 124
 hygienic, 124
 medicinal, 125
 gynæcological, 125
 obstetrical, 125
 Hyperlactation, 78
 Hypoblast, 24
 Hysteria in pregnancy, 131
 in labor, 82

ICTERUS of newborn, 68
 Imperforate rectum, 65
 Impetigo herpetiformis, 136
 Impregnation, most likely time of, 22
 Incarceration of retro-displaced gravid uterus, 119
 Incontinence of urine, 81
 Induction of abortion, 176
 indications for, 176
 method of, 177
 of premature labor, 178
 indications for, 178
 method of, 178
 Infant, newborn. (*Vide* Newborn Infant.)
 Infectious diseases complicating pregnancy, 135
 puerperium, 94
 erythema, 93
 Injuries, after labor, repair of, 74
 during pregnancy, 137
 Inlet of pelvis, diameters of, 97
 Insanity, puerperal, 82, 131
 Insemination, 20
 Inversion of the uterus, 207
 Involution of the uterus, 72, 155
 Irritability of bladder, 116
 of uterus, 138

JAUNDICE of newborn infant, 68
 Jorissenne's sign of pregnancy, 116

KIDNEY insufficiency in pregnancy, 126, 127
 treatment of, 127
 of pregnancy, 126
 Knots in umbilical cord, 31
 Kysteinic pellicle, 117
 Kyphosis, 102

LABOR, anæsthesia in, 152
 antisepsis in, 106, 107
 attention to child after, 154, 161
 bladder and rectum in, 152
 chloral in, 152
 chloroform in, 152
 clinical signs of, 151
 death, sudden, after, 211
 delayed, treatment of. (*Vide* Dystocia.)
 determining causes of, 150
 examination in, 152
 in contracted pelvis, 195
 injuries after, repair of, 74
 management of, 152
 mechanism of, 161
 in brow presentations, 171
 in contracted pelvis, 166
 in face presentations, 169
 in pelvic presentations, 172
 in vertex presentations, 165
 missed, 117
 pathology of. (*Vide* Dystocia.)
 perineum, care of, during, 153
 phenomena of, 151
 premature, induction of, 178
 premonitory signs of, 151
 preparation of bed for, 108
 pulse after, 156
 rupture of membranes in, 153
 temperature after, 157
 Laceration of perineum, 153
 cause of, 153
 preventive treatment of, 153
 repair of, 74
 Lactation, 154
 Laparo-cystectomy, 192
 -elytrotomy, 192
 Laparotomy for obstetrical complications, 193

- Liquor amnii, 26
 function of, 26
 origin of, 26, 27
- Liver, acute yellow atrophy of, 126
- Lochia, 155
- Locking of children in twin labor, 199
- M**ACERATION of fœtus, 42
 Mammary glands, changes of, in pregnancy, 111
 diseases of, 79
- Mastitis, 79
 in newborn infant, 64
- Mechanism of labor, 161. (*Vide* Labor, mechanism of.)
 of third stage, 175
- Meconium, 46, 173
- Medication of newborn infant, 71
- Melæna, 70
- Menstruation, 17
 causes of, 18
 duration of, 17
 phenomena of, 17
 relation of, to ovulation, 18
- Mental disorders, 131
- Mesoblast, 24
- Micrococci in puerperal fever, 83
- Milk, condensed, analysis of, 55
 as an infant food, 55
 cows', analysis of, 52
 mother's, analysis of, 49
 compared with cows', 52
 proteids of, 49
 quantity of, at each nursing, 50
 secretion of, 49
 factors, influencing, 50, 51
- Milk leg, 92
- Miscarriage. (*Vide* Abortion.)
- Missed abortion, 141
 labor, 117
- Monstrosities, classification of, 38
- Multiple impregnation, 36
 causes of, 36
 prognosis of, 37
- Mummification of fœtus, 42
- N**ASAL catarrh, in newborn infant, 65
- Nausea of pregnancy, 110
- Nervous system, diseases of, in pregnancy, 130
- Neuralgia in pregnancy, 130
- Newborn infant, 45
 airing of, 56
 anatomical points about, 47
 aphthæ of, 65
 artificial feeding of, 52
 asphyxia of, 59
 bathing of, 56
 blood of, 46
 bloody discharge from genitalia of female, 71
 bowels of, 46
 Buhl's disease of, 70
 cleansing of, 56
 clothing of, 48
 colic of, 66
 congenital deformities of, 64
 constipation of, 66
 cord of, 47
 cyanosis of, 66
 diarrhœa of, 66
 digestion of, 45
 diseases of, 61
 excretions of, 46
 eyesight of, 46
 feeding of, 49, 159
 gavage of, 48
 heart of, 47
 hemophilia of, 67
 icterus of, 68
 incubation of, 48
 injuries of, 56
 intestinal perforation in, 70
 intussusception in, 70
 jaundice of, 68
 length of, 105
 liver of, 47
 management-of, 48
 mastitis of, 64
 meconium of, 46, 173
 medication of, 71
 medico-legal points about, 47
 melæna of, 70
 nasal catarrh of, 65
 œdema of, 71
 ophthalmia of, 67
 pathology of, 56
 pemphigus of, 66
 physiology of, 45
 premature, abnormalities in physiology of, 48
 pulse of, 46
 respiration of, 45
 sclerema of, 48

- Newborn infant, skin diseases of, 66
 specific fevers of, 64
 stomach, capacity of, 45
 stomatitis of, 66
 sublingual cyst of, 66
 sudden death of, 71
 syphilis of, 63
 temperature of, 46
 tetanus of, 70
 thrush of, 65
 umbilical diseases of, 69
 urine of, 46
 weight of, 45
 Winckel's disease of, 71
- Nipples, care of, during pregnancy, 79
 during puerperium, 159
 diseases of, 79
 diseases, treatment of, 79
 fissure of, 79
 inversion of, 79
- Nurse, directions to, 160
 wet, selection of, 51
- O**BJECTIVE signs of pregnancy, 111
- Obstetric operations, 176
- Obstetrician, armamentarium of, 152
- Obstructed labor due to foetal obstructions, 198
 maternal obstructions, 195
- Occipito-posterior positions, 166
 management of, 168
 mechanism of, 166
- Edema neonatorum, 71
- Oligohydramnios, 27
- Omphalorrhagia, 69
- Operations, obstetric, 176
- Ophthalmia neonatorum, 67
- Ovulation, 18
- Ovule, anatomy of, 19
 changes in fertilized, 23
- P**ALPATION, abdominal, 162
 Pathology of labor. (*Vide Dys-*
tocia.)
 of pregnancy, 118
- Pelvic cavity, diameters of, 98
 direction of, 98
- Pelvimetry, 102
- Pelvis, anatomy of, 97
 angle of, 97
 deformities of, 100
 diagnosis of commoner
 forms of, 104, 105
 management of labor in, 195
 development of, 98
 diameters of, 98
- Pemphigus, simple acute, 66
 syphilitic, 67
- Perineum, laceration of, 153
 repair of, 74
 support of, 153
- Peritonitis in puerperal fever, 87
- Pernicious vomiting of pregnancy, 124
- Phlebitis, septic. (*Vide Phlegmasia.*)
- Phlegmasia alba dolens, 92
- Phthisis complicating pregnancy, 95, 135
- Physiology of mature foetus, 36
 newborn infant, 45
- Physometra, 42
- Pigmentation, exaggerated, of pregnancy, 137
- Placenta, adherent, 176
 anatomy of, 33
 anomalies of, 34
 degenerations of, 34
 development of, 33
 diseases of, 34
 expression of, 154
 expulsion of, 152
 functions of, 34
 prævia, causes of, 201
 diagnosis of, 201
 frequency of, 201
 prognosis of, 202
 treatment of, 201
 retention of, 175
 separation of, 152
 situation of, 33
- Pleurisy complicating pregnancy, 135
- Pneumonia complicating labor, 211
 pregnancy, 135
 of newborn infant, 62
- Podalic version, 185
- Polygalactia, 78
- Position, diagnosis of, 162
 definition of, 161
- Positive signs of pregnancy, 111, 112
- Post-mortem delivery, 212
- Post-partum hemorrhage, 204

- Post-partum hemorrhage, causes, 204
treatment, 204
- Predicting date of confinement, 113
- Pregnancy, changes in maternal organism in, 113
general, 116
local, 113
diabetes in, 129
diagnosis of, 110
diseases of, 118
duration of, 150
extrauterine, 141
clinical history of, 142
diagnosis of, 148
signs of, 147
terminations of, 145
treatment of, 148-150
hydræmia of, 116
- Pregnancy in one horn of uterus, 150
insanity of, 131
kidney of, 126
management of, 117
multiple, causes of, 37
foetal appendages in, 37
pathology of, 118
abortion, 138
accidents, 137
alimentary canal, 123
circulatory apparatus, 132
displacements of gravid uterus, 118
extrauterine gestation, 141
genitalia, 118
infectious diseases, 135
injuries, 137
miscarriage, 138
nervous system, 130
osseous system, 135
premature labor, 138
respiratory apparatus, 134
skin, affections of, 136
surgical operations, 137
urinary apparatus, 126
physiology of, 113
prolongation of, 117
signs of, 110-143
objective, 111
subjective, 110
- Premature labor, induction of, 178
indications for, 176
method of, 177
- Preparation for labor, 108, 152
of artificial food, 53
- Presentation, definition of, 161
diagnosis of, 162
varieties of, 165
brow, 171
face, 169
greater fontanelle, 172
pelvic, 172
shoulder, 174
vertex, 165
- Prolapse of cord, 200
of gravid uterus, 120
- Pruritus, 137
- Pseudocyesis, 111
- Ptomaines, 106
- Puerperal convulsions, 208
erythema, 93
fever, diagnosis of, 89
infectious, 84
morbid anatomy, 85
non-infectious, 95
peculiar manifestations of, 92
symptoms of, 89
treatment of, 90
- hemorrhage, 75
insanity, 131
pemphigus, 94
rheumatism, 93
- state, after-pains, 156
antisepsis in, 109
breasts in, 159
catheter in, 158
circulation in, 156
diagnosis of, 158
diet in, 159, 160
directions to nurse, 160
duration of, 154
involution of uterus in, 155
lochia in, 155
loss of weight in, 157
malaria in, 94
management of, 158
nipple, care of, 159
nursing in, 159
pathology of, 72
abnormalities of involution, 72
anæmia, 74
anomalies of the breasts, 77
diseases of nervous system, 82
diseases of urinary apparatus, 81

Puerperal state, pathology of, fever, 83
 hemorrhages, 75
 injuries, repair of, 74
 physiology of, 154
 pulse in, 156
 retention of urine in, 156
 secretions in, 156
 temperature in, 157
 tetanus in, 94
 urinary function in, 156
 vaginal injections in, 96, 97
 visits during, 158

Puerperium. (*Vide* Puerperal state.)

QUICKENING, 110

RACHITIC pelvis, characteristics of, 102

Rectum, imperforate, in newborn infant, 65

 in labor, attention to, 152

Respiration, artificial, 60

 institution of, physiology of, 59

Respiratory apparatus, diseases of, in pregnancy, 134

Restitution, 165

Retained placenta, 175

Retention of urine, 156

Retroflexion of gravid uterus, 118

Rigidity of cervix, 196

Rupture of cervix, 74

 of membranes, 53

 of perineum, 74, 153

 of symphysis, 208

 of uterus, 206

SÄNGER'S operation, 190

 Secretion of milk, 50, 157

Section, Cæsarean, 189

Segmentation of ovule, 23

Selection of wet nurse, 51

Seminal fluid, 20

Septicæmia, 83

Septic infection, avoidance of, 158

 mortality of, 92, 106

 of lung in newborn infant, 62

 symptoms of, 89

Sex, determination of, 36

Shock, after labor 211

Shoulder, presentation of, 174

 dangers of, 175

 diagnosis of, 174

 treatment of, 175

Signs of pregnancy, 110-113

Skin, diseases of, in pregnancy, 136

Spina bifida, 65

Spermatic particle, 21

Spontaneous amputations, intra-uterine, 41

 delivery in transverse presentations, 175

 evolution, 175

 fractures, 41

 version, 175

 luxations, 41

State, puerperal. (*Vide* Puerperal state.)

Sterilization of infants' food, 54

Stomatitis, gonorrhœal, 66

Subinvolution, 72

Sublingual cysts, 66

Super-fecundation, 37

 -fœtation, 37

 -impregnation, 37

Supernumerary digits, 64

Sutures of fœtal head, 164

Symphiseotomy, 189

Syphilis, causing abortion, 43

 in pregnancy, 136

 of the fœtus, 42

 of the lung in newborn infant, 61

 of newborn infant, 63

TAMPON in abortion, 140

 in placenta prævia, 202

 in post-partum hemorrhage, 205

Tetanus of newborn infant, 70

 puerperal, 94

Thrush, 65

Tongue-tie, 64

Torsion of cord, 31

Traction with forceps, 181

Tubal pregnancy, 142

Tuberculosis of newborn infant, 62

Tumors complicating labor, 197

Twin pregnancy, 37

 appendages in, 37

Twins, dystocia due to, 199

 management of, 199

- Tympanites, acute, 73
 uteri, 42
 Typhoid fever in labor, 211
 in pregnancy, 136
- U**MBILICAL cord, abnormalities of, 30
 constituents of, 30
 development of, 30
 hemorrhage from, 69
 prolapse of, 200
 Umbilicus, diseases of, 69
 hemorrhage from, 69
 Unavoidable hemorrhage, 201
 Urination, disturbances of, in pregnancy, 116
 in puerperium, 81
 Urine, anomalies of, in pregnancy, 129
 Uterine inertia, 194
 muscle, diseases of, 121
 involution of, 72
 rheumatism of, 121
 Uterus, action of, in labor, 151, 164
 anomalies of, 105
 bicornis, pregnancy in, 150
 changes of, in pregnancy, 113
 in puerperium, 72
 dimensions of, 115
 displacements of gravid, 118, 197
 incarceration of gravid, 118
 inertia of, 194
 inversion of, 207
 involution of, 72
- Uterus, irritability of, 138
 malformations of, 105
 one-horned, pregnancy in, 150
 rupture of, 206
 sinking of gravid, 151
 tympanitis of, 42
- V**AGINA, anomalies of, 105
 changes of, in pregnancy, 113
 color of, in pregnancy, 111
 diseases of, in pregnancy, 121
 injuries of, treatment, 74
 Valvular heart disease in labor, 211
 Varicose veins in pregnancy, 133
 Vegetations of vulva, 122
 Vernix caseosa, removal of, 154
 Version, contraindications for, 183
 indications for, 183
 methods of, 183
 varieties of, 183
 Vertex, positions of, 163
 presentation, mechanism of, 165
 posterior position of, 166
 Visits of physician after labor, 158, 159
 Vomiting in pregnancy, 110, 124
 Vulva, diseases of, in pregnancy, 121
 hæmatoma of, 76
 pruritus of, 121
 vegetations of, 121
- W**ET nurse, selection of, 51
 Winckel's disease, 71

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